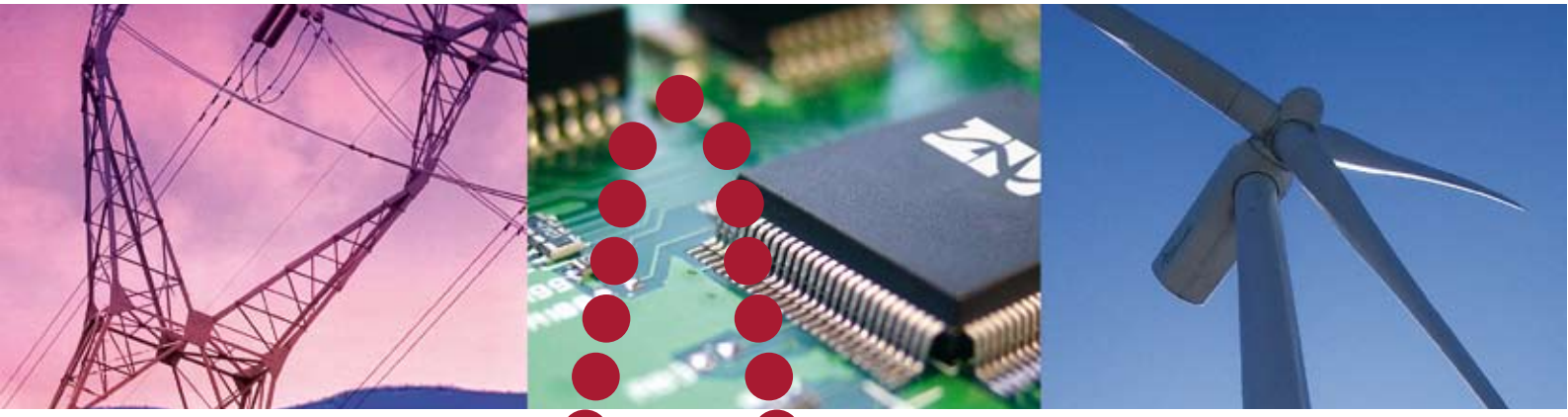
grid automation



CWE

Embedded Web HMI

Instructions Manual

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BCWE1208Av01

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The **Embedded Web HMI (CWE)** consists of a group of applications linked to the **Substation Central Unit** (**SCU**) and therefore part of the Integrated Substation Protection and Control System (SIPCO).

CWE functions are, among others:

- Communications with SCU devices.
- Intuitive display of substation data on graphic screens.
- Possibility to operate any element via interlocking management.
- Event and alarm management with the possibility of global or separate acknowledgement.

This User Manual refers only to **CWE**, although, inasmuch as said application is linked to **SCU**, its data will be used.

1.1 General

The **Embedded Web HMI** consists of a number of applications embedded in the SCU the function of which is to monitor data from this central unit. To display these data, client computers (PCs) must have Internet Explorer browsers installed, versions 6 or 7.

A nested menu allows navigation through the different displays to show updated Substation data.

The whole system is configurable, two levels being discerned:

- Substation configuration: this operation is carried out via ***Zivergraph***®. This software allows system configuration so as to match substation features: connected devices, device signals, data display on screens, logic functions for substation automation, wanted functions, etc.
- Specific HMI configuration: this is carried out via edition of configuration file **ConsoleBaseConfig.xml**. This file allows the configuration of the rest of system issues not handled by the ***Zivergraph***®, as are the system web server IP or the type of connection (data transfer rate) between HMI and the clients. However, the **CWE** can detect and update all alone most of configuration parameters, so that editing this file will not be required except for specific situations. In any case, changes are not recommended without having a broad knowledge of their nature.

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1.2 Components

The Embedded Web HMI consists of a number of applications linked to each other, stated below.

- **DataProviderCE.exe.** Is the main system application. It is linked to the central unit via sockets using a proprietary protocol and can reside in said central unit or be external to it. It keeps a continuously updated database that reflects real time substation status. This module supplies web clients with necessary data in order for them to show substation data on the different displays, as well as recording all user operations and act accordingly.
- **Web Client.** Consists of a number of interactive web pages the function of which is to display real time substation data on different screens. It also operates as graphic interface, allowing the user to have total substation control. Communications between web client and main application is via sockets through a proprietary protocol.

It is worthwhile mentioning that, although the Embedded Web HMI and SCU can be in different devices, the different components of the Embedded Web HMI must always reside in the same system.

1.3 Functions

The Embedded Web HMI features the following main functions.

- **Databases**

After booting, the Embedded Web HMI requests the complete substation database from the SCU. From now on, it is the SCU which sends any change in said signals. However, certain operations, such as periodic measurement and meter data requests, must specifically be requested by the HMI.

- **Commands**

From single line diagram screens, the user requests the execution of substation device commands. This request translates into a number of previous checks prior to sending it to the SCU. These checks consist of configurable interlocks linked to the object representing the device concerned.

Commands are finally executed by the device concerned. Command execution is confirmed by a change of the substation state. If the command is not executed due to interlocks, a dialogue box will be displayed with all signals that block the requested operation.

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- **Event management**

From any screen, access can be gained to a specific screen with a list of the events captured by the SCU, ordered by date and time. A number of filters make the display of these data easier. This is a circular list that can store a configurable number of events, the default value being 500. The last received events are always saved.

- **Alarm management**

From any screen, access can be gained to a **CWE** screen with a list of alarm data. Said list can be filtered using different criteria to show only the information wanted, for instance displaying only **Active alarms** or acknowledged alarms.

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2. Technical Data

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2.1 Features of the Embedded Web HMI

The Embedded Web HMI consists of a number of applications embedded in ZIV own systems. Therefore, no specific hardware requirements of the devices where it is installed must be complied with.

The customer can connect to the **CWE** from any computer with Windows XP and Internet Explorer (6 or 7) installed. However, for optimal system performance, computers complying with the following specifications are recommended. In any case, computer specifications will be determined by substation size.

Processor:
PENTIUM 1.8 GHz or higher
1 GB RAM or higher
Graphic Controller with 1024x768 pixels minimum resolution.
Network card 10/100

Keyboard
Mouse
Monitor

Operating System Microsoft Windows XP with SP2.

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3. Installation and Start-up

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3.1 Installation of the Embedded Web HMI

The Embedded Web HMI consists of a number of SCU resident applications that are therefore factory configured and installed, no action being required on the part of the user.

However, it is recommended that the user carries out same modifications in client computer configurations. Said modifications affect three different areas.

- Graphics section settings.
- Modifications of Internet Explorer's configuration settings.
- Installation and configuration of an external printer (optional).

3.1.1 Graphics Section Settings

Although it is not imperative, for best display quality it is recommended to follow the instructions below.

1) Right click on the Windows desktop.
2) Click '**Properties'** in the contextual menu.

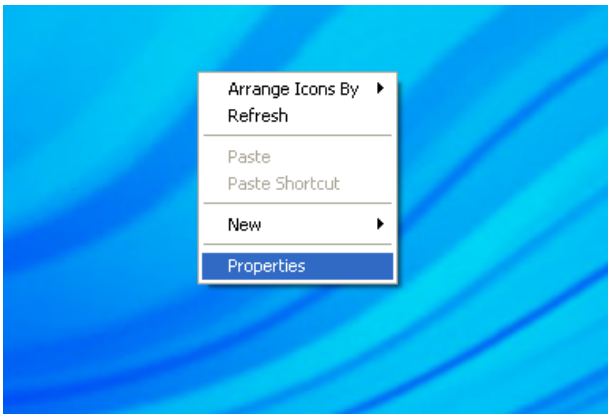

Figure 3.1: Desktop Contextual Menu.

3) Select tab '**Settings'** in the '**Display Properties'** window.
4) Drag the screen resolution slider for optimum resolution. The order of preference shall be:
   1280x960
   1024x768

Note: any graphics resolution can be used but best results are obtained with those that keep an aspect ratio of (4/3). However, resolutions below 1024x768 are not recommended.

5) Click '**Apply'** and then '**OK'**.

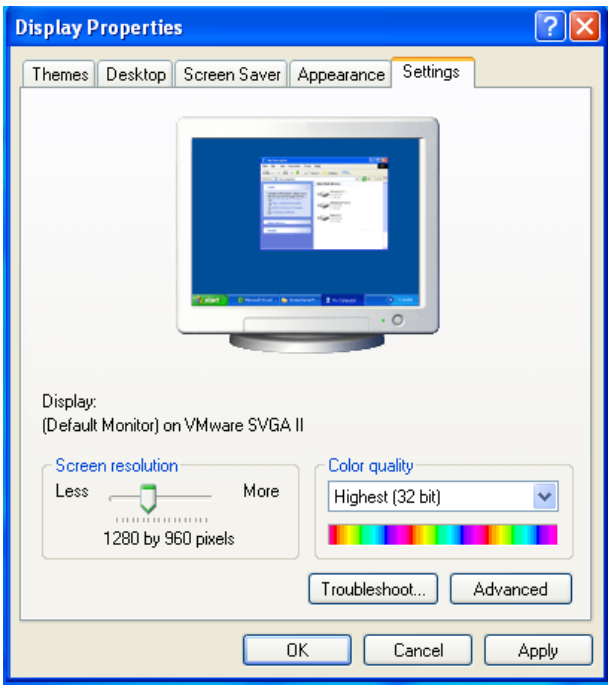

Figure 3.2: Screen Configuration.

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3.1.2 Changes in IE Configuration Settings

The Embedded Web HMI application is an interactive web page that should work in any XP system with no need for reconfiguration. However, conflict can occur if the client PC has certain functions or elements active (e.g. the Google bar). It is also possible that unnecessary confirmation dialogue boxes pop up as a function of the PC security settings. In view of the above, the following checks are recommended to ensure optimal application performance.

1) Open Internet Explorer and drop down menu 'Tools'.
2) Place the cursor on option 'Pop-up Blocker'. Options will drop down.

Figure 3.3: Tools Menu.

3. Select **'Turn Off Pop-up Blocker'** (it might have already been done. In this case, option **'Turn On Pop-up Blocker'** will show up and no action is needed).

4. Again in the menu **'Tools'** select **'Internet Options'**.

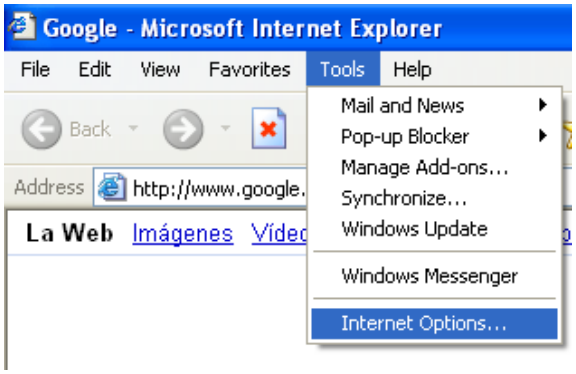

Figure 3.4: Tools Menu: Internet Options.

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5. In the window **Internet Options** select tab **'Security'.**

6. Select '**Trusted sites'** option and then click on **'Sites'**.

Figure 3.5: Security.

7. Under **'Add this Web site to the zone:'** enter the text: **http://XXX.XXX.XXX.XXX** (where XXX.XXX.XXX.XXX will be the SCU's IP), and click **'Add'**. The entered IP will show up in the list '**Web Sites'**.

8. Untick the box **'Require server verification (https:) for all sites in this zone'**.

9. Click **'OK'**..

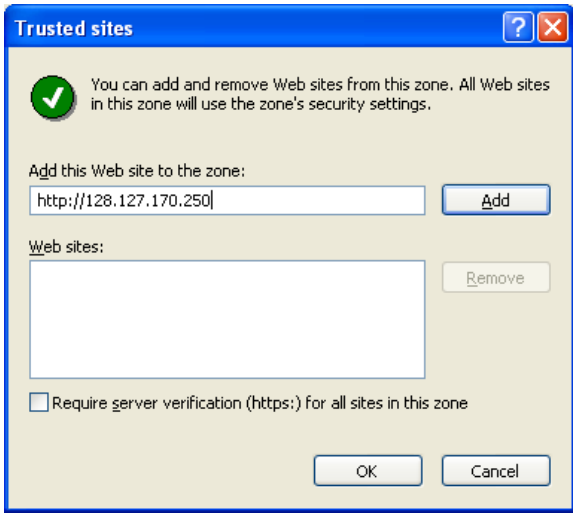
Trusted sites
You can add and remove Web sites from this zone. All Web sites in this zone will use the zone's security settings.
Add this Web site to the zone:
http://128.127.170.250
Add
Web sites:
Remove
Require server verification (https:) for all sites in this zone
OK
Cancel

Figure 3.6: Secure Sites.

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10. Click **'Custom Level...'** always ensuring that the selected option still is **'Trusted sites'**.

Note: You must be aware of the version of IE that is installed in your computer. To find this information, click 'Help' and choose 'About Internet Explorer' in the drop down menu.

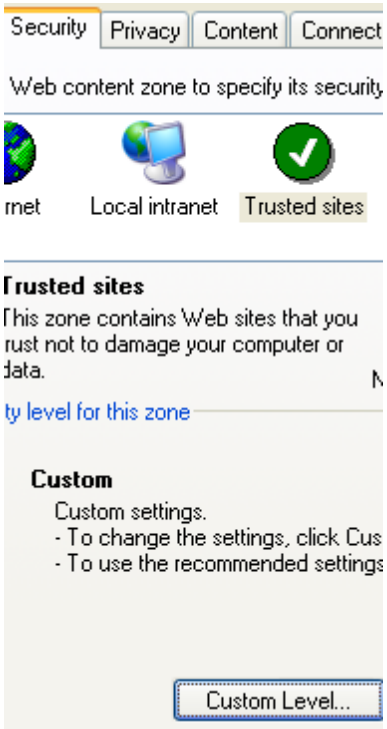

Figure 3.7:Secure Sites (Customized Settings).

- **Security configuration of Internet Explorer 7**

1. In section **'Scripting'** enable **'Scripting of Java applets'**.
2. In section **'.NET Framework-reliant components'** activate both options.
3. In section **'ActiveX controls and plug-ins'** enable all options except the **'Automatic prompting for ActiveX controls'**, which must be disabled.
4. In section **'Downloads'** enable **'File download'** and **'Font download'** and disable **'Automatic prompting for file downloads'**.

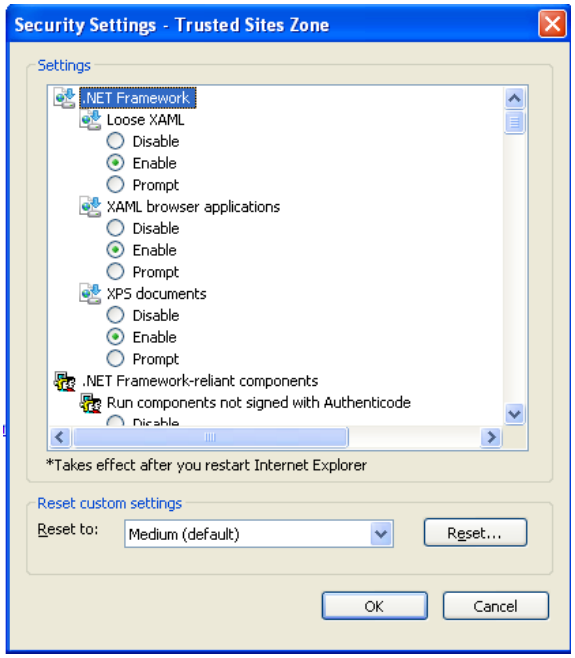

Figure 3.8: Security Configuration.

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5. In section **'Miscellaneous'**, click **'Enable'** in option **'Allow websites to open windows without address or status bars'**.
6. Click **'OK'**.
7. Back to window **'Internet Options'** click tab **'Advanced'**.
8. Tick **'Reuse windows for launching shortcuts (when tabbed browsing is off)'**.
9. Click **'Apply'** and then **'OK'**. Close all windows.

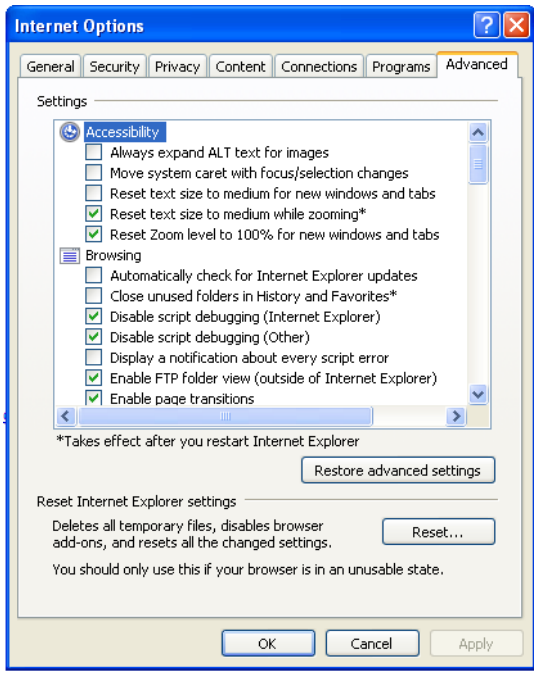
Internet Options
General
Security
Privacy
Content
Connections
Programs
Advanced
Settings
Accessibility
Always expand ALT text for images
Move system caret with focus/selection changes
Reset text size to medium for new windows and tabs
Reset text size to medium while zooming*
Reset Zoom level to 100% for new windows and tabs
Browsing
Automatically check for Internet Explorer updates
Close unused folders in History and Favorites*
Disable script debugging (Internet Explorer)
Disable script debugging (Other)
Display a notification about every script error
Enable FTP folder view (outside of Internet Explorer)
Enable page transitions
*Takes effect after you restart Internet Explorer
Restore advanced settings
Reset Internet Explorer settings
Deletes all temporary files, disables browser add-ons, and resets all the changed settings.
Reset...
You should only use this if your browser is in an unusable state.
OK
Cancel
Apply

Figure 3.9: Advanced Options.

- **Security configuration of Internet Explorer 6**

1. In section **'Scripting'** enable all options.
2. In section **'.NET Framework-reliant components'** enable all options.
3. In section **'ActiveX controls and plug-ins'** enable all options except **'Automatic prompting for ActiveX controls'**, which must be disabled.
4. In section **'Downloads'** enable **'File download'** and **'Font download'** and disable **'Automatic prompting for file downloads'**.
5. In section **'Miscellaneous'**, select **'Low safety'** in option **'Software channel permissions'**. Select also '**Enable'** in option **'Allow scripting of Internet Explorer Webbrowser control'** and **'Enable'** in option '**Allow script-initiated windows without size or position constraints'**. Finally, disable **'Use Pop-up Blocker'.**

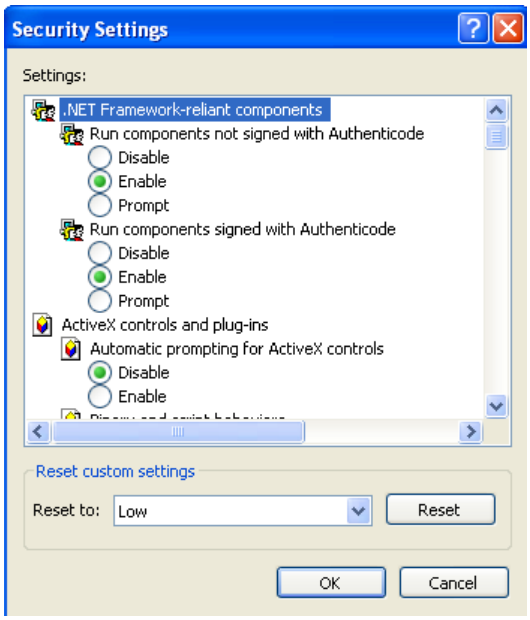

Figure 3.10: Security Configuration of Internet Explorer 6.

6- Click **'OK'**.

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7- Back to window **'Internet Options'** select tab **'Advanced'**.
8- Tick the option **'Reuse windows for launching shortcuts'**.
9- Click **'Apply'** and then **'OK'**. Close all windows.

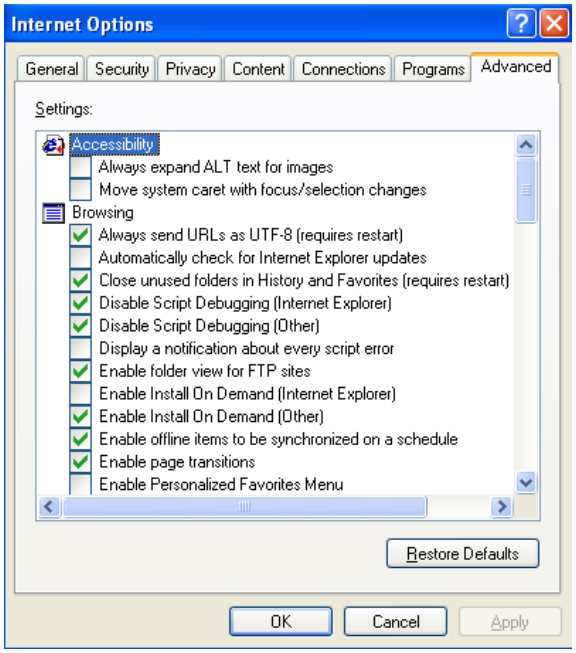

Figure 3.11: Advanced Options Internet Explorer 6.

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3.1.3 Installation of an external printer

In case an external event printer is to be connected to the system, below are the steps to follow in the PC directly connected to the printer.

3.1.3.a Installation of Internet Information Server (IIS)

1- Clicking **'Start -> Control Panel -> Add or Remove Programs'** displays the Add or Remove Programs screen.

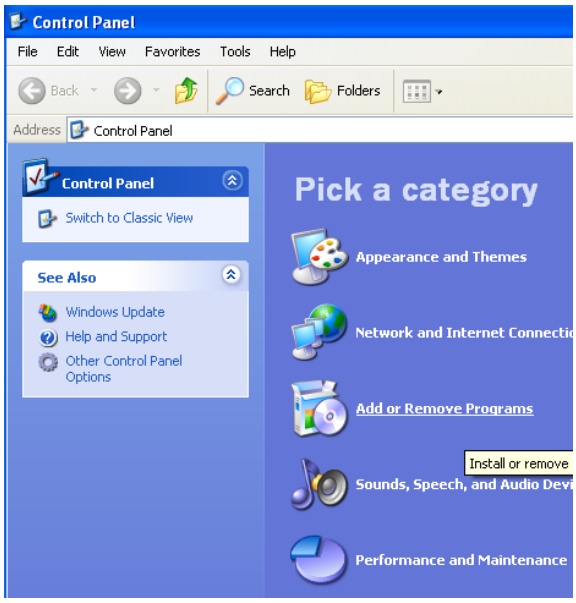

Figure 3.12: Control Panel.

2- In the options to the left select **'Add/Remove Windows Components'**.

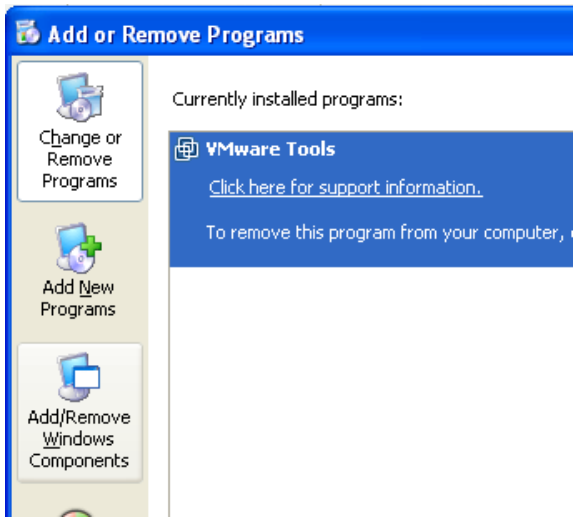

Figure 3.13: Add or Remove Programs.

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3- In the list of displayed components, tick the box **'Internet Information Services (IIS)'**.
4- Click **'Next'** and the installation of the IIS will commence (the Windows XP installation CD might be required).

After the installation has finished, click **'Finish'** and close all windows.

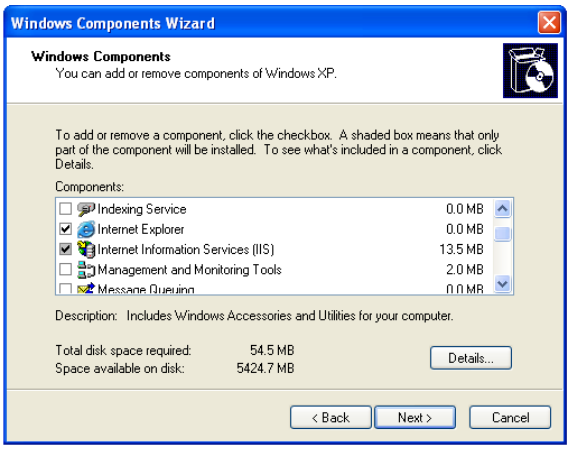
Windows Components Wizard
Windows Components
You can add or remove components of Windows XP.
To add or remove a component, click the checkbox. A shaded box means that only part of the component will be installed. To see what's included in a component, click Details.
Components:
Indexing Service 0.0 MB
Internet Explorer 0.0 MB
Internet Information Services (IIS) 13.5 MB
Management and Monitoring Tools 2.0 MB
Message Queuing 0.0 MB
Description: Includes Windows Accessories and Utilities for your computer.
Total disk space required: 54.5 MB
Space available on disk: 5424.7 MB
Details...
< Back
Next >
Cancel

Figure 3.14: Wizard for Windows Components.

3.1.3.b Installation of printer web service

Installation of **Internet Information Server (IIS)** will have created in the computer's main drive a directory with the name **Inetpub** (normally C:\Inetpub).

1- Extract the file **PrinterInstallation.rar** into directory **\Inetpub\wwwroot**.
2- Click on **Start -> Control Panel -> Administrative Tools -> Internet Information Service**.
3- Expand nodes **Local computer -> Web Sites -> Default Web Site**.
4- Right click on node **PrinterWebService** and click **Properties**.

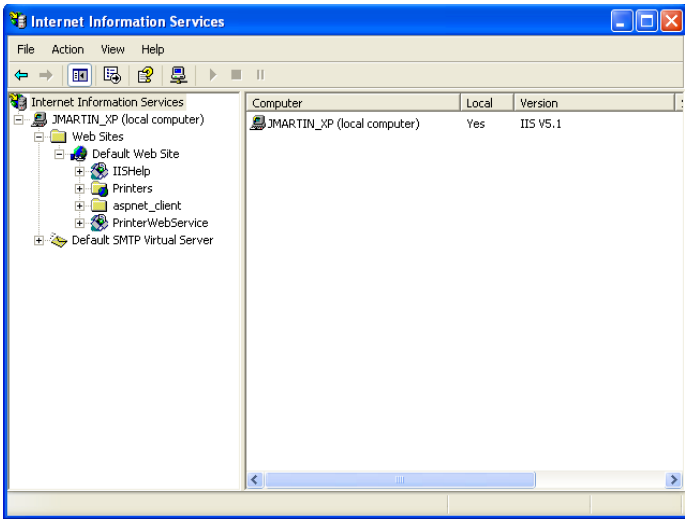

Figure 3.15: Internet Information Server Service.

5- In tab **Directory**, section **Application Settings** click **Create**.
6- Close all windows.

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3.1.3.c Printer Configuration

Open SCU' file **"\CfDisk\webcon\bin\ConsoleBaseConfig.xml"**

- Look for option **ConsoleHasSystemAPrinter** and set **value="yes"** (enables printing).
- Look for option **PrinterIP** and set value to the IP of the PC to which the printer is connected. (e.g. value="128.127.130.22").
- Look for option **PrinterPort** and set value to the identifier of the port to which the printer is connected. (e.g. value="LPT1").

Note: carriage return characters can be modified through option CarriageReturnChar in the same configuration document section. This parameter accepts both characters and strings.

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4.1 Application Start-up

The HMI application starts up automatically when booting the SCU, connecting to it and capturing all necessary data. If the start up process is correct, after a time lapse, the IHMI led on the device front panel goes off. From now on, any user can connect to the SCU web server to open a HMI display.

On the contrary, if after a few minutes, the LED is still on, this will show that problems are occurring. In this case two situations are possible:

- The web HMI could not be started.
- The web HMI started but there are problems with HMI and SCU configurations.

Both cases will be dealt with later in this same section.

To open a web client session just open an Internet Explorer window from any PC connected to the system. Then, type the SCU IP in the address bar, as shown in picture.

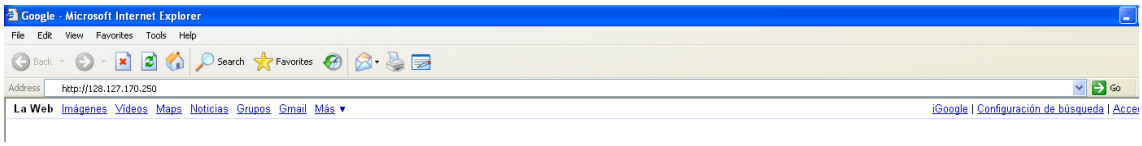
Google - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://128.127.170.250
Go
La Web Imágenes Videos Maps Noticias Grupos Gmail Más
iGoogle | Configuración de búsqueda

Figure 4.1: URL.

Now the web client session is initiated, and consists of the following steps.

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4.1.1 Checking the Installed Components

The web client checks if all the components required to run the application are installed in the PC. Otherwise, the missing elements will be downloaded and installed. The user must preferably select the option '**Run**' rather than '**Save**' in the dialogue box. Otherwise, the installation must be carried out manually. Also answer affirmatively any questions raised by the system.

After the correct installation of all the components the following screen is displayed:

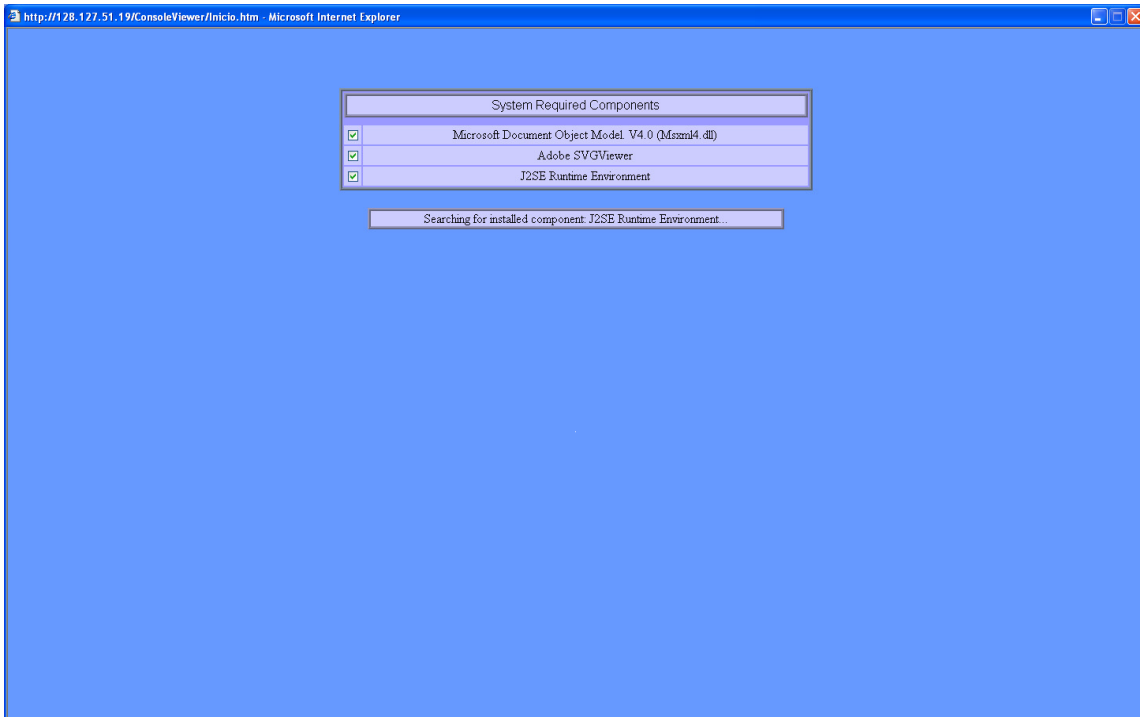
http://128.127.51.19/ConsoleViewer/Inicio.htm - Microsoft Internet Explorer
System Required Components
Microsoft Document Object Model. V4.0 (Msxml4.dll)
Adobe SVGViewer
J2SE Runtime Environment
Searching for installed component: J2SE Runtime Environment...

Figure 4.2: System Analysis Page.

and the process for the connection of the web page to the embedded HMI will start.

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4.1.2 Loading the Web Page

During the connecting process a number of dialogue boxes will keep the user informed on the web client initiation stage. Below are the steps followed during the initiation:

- Setting the connection with the HMI application and reception of the client identifier (UID).
- Reception of the alarm and event list.
- Loading files for graphical representation of the substation.
- Updating the state of elements of the single line diagram.

If the entire process has been carried out correctly, at the end the user will be facing a screen representing the substation single line diagram.

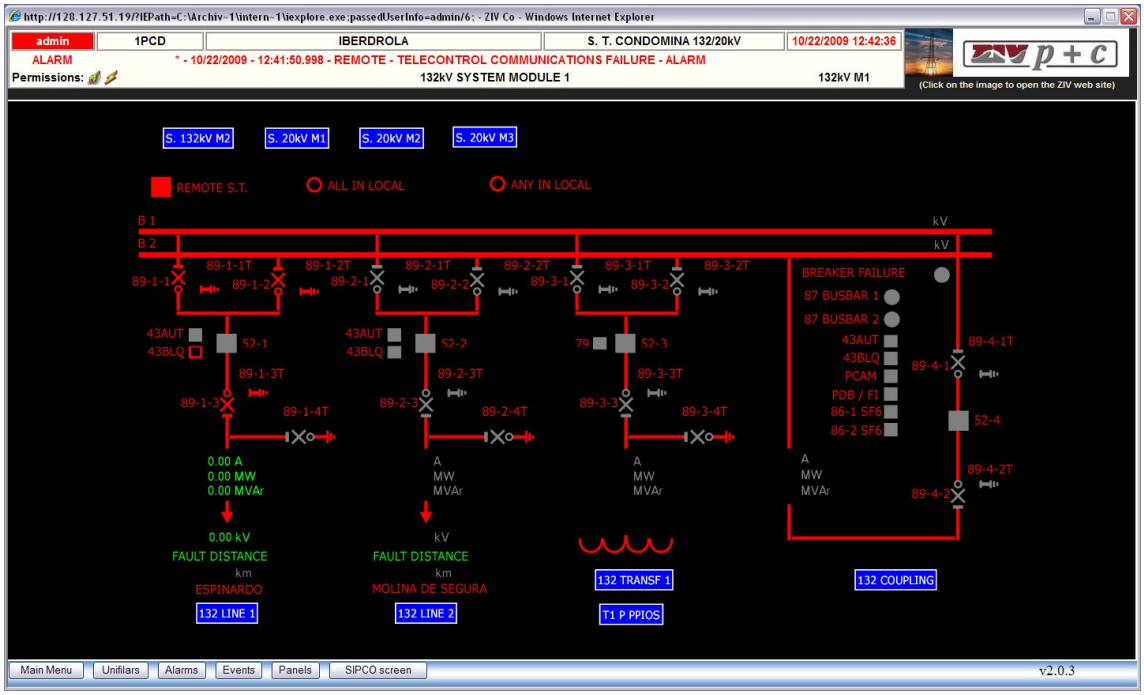

Figure 4.3: Single-line Diagram.

The page can now be used. Any change in the state of any element will immediately be reflected in the display.

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4.1.3 Initialisation Errors

If errors occur during HMI initialisation, these will be reflected in that the HMI LED on the SCU front panel remains on. To find out the type of problem just open a web client. Errors can be caused by two reasons:

- **The HMI has not started.** After start, the web page shows a connection error message (associated code 2). This can be caused by a number of reasons. To find out the problem, file **consola.log** in SCU directory **\CfDisk\Webcon\Log** must be reviewed.
- **Inconsistencies between HMI and SCU configurations.** The web page will connect to the HMI but a dialogue box will appear showing configuration errors. The user can find out system errors by clicking '**See Errors**' in said dialogue box. This will display a window with SCU and HMI application configuration settings, highlighting the differences with an asterisk. The user can also reconfigure the system selecting the applicable menu option. Parameters to be compared to find out inconsistencies are: **number of devices configured**, **devices address**, **number of device signals** and **SCU model**.

4.2 Screen Arrangement

The purpose of the HMI is, as stated above, to graphically display data received from the **SCU** for the user to know the actual substation data. To this end, a number of screens are used through which the operation of given substation devices are also possible.

Navigation between different screens is made through the *main menu*, display elements and the button pad situated at the bottom of the screen. To switch screens just move the pointer to the wanted option and left click the mouse.

Page format is common to all screens. Pages are divided into three distinct areas: *header*, *graphics* area and *function button* area (herewith known as *button pad*).

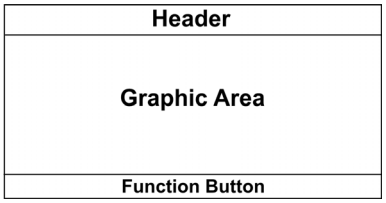

Figure 4.4: Page Format.

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4.2.1 Header

The header is composed of three lines and one graphics area to the right (see figure 4.5).

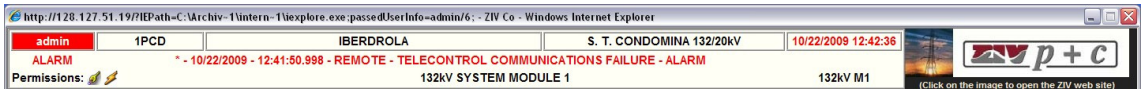

Figure 4.5: Page Header.

- **First line: general data**

This line contains five fields:

- Name of the user who granted current active permissions.
- SCU identifier.
- Identifier of the company using the HMI.
- Substation name.
- Date and time with format dd/mm/aa and hh/mm/ss respectively.

- **Second line: last alarm or event message and operating mode**

- Indicates if any alarm has been tripped. In this field a red text ALARMA, will flash whenever newly activated alarms are still to be acknowledged. Once all alarms have been acknowledged, the applicable text stops flashing but the red colour remains. If there are no active alarms, said text does not appear. Both colour and flashing can be configured.
- Last alarm or event message received in the HMI the format of which will be described later. Newly activated events replace previous ones in the area.
- In systems with **local/remote** modes, this line will also show the actual system mode (**IHM in Local** mode or **IHM in Remote** mode).

- **Third line: information about the type of screen**

- Permissions granted to the current user. In case user permissions are disabled (owing for instance to local/remote mode) the associated images will appear translucent.
- Information screen name.
- Identifier of displayed section.

- **Graphics area to the right:**

A graphics section appears to the right of the header the function of which varies depending on HMI installation state.

- If no HMI installation errors exist, a **ZIV** corporation image will be displayed in this area. Click on it to gain access to the company web page.
- If errors do exist, a flashing warning will appear in this area. Clicking on it displays a new window with information about the errors detected. It is worth mentioning that errors herewith mentioned are minor errors that allow for normal HMI operation.

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4.2.2 Graphics Area

The contents of this area vary as a function of the current screen: single line, alarm list, panels, SIPCO state, etc. These screens will be described later on.

4.2.3 Button Pad for Display Change

This is the button area at the bottom of the screen. These buttons are for navigation through the different HMI sections/displays. The version number of the currently installed HMI can be found at the right end of this area.

Figure 4.6: Function Buttons.

The different buttons give access to the following sections:

- **Main Menu:** displays the main menu screen.
- **Unifilars:** displays the last single line diagram visited.
- **Alarms:** displays the Alarm screen.
- **Events:** displays the Events screen.
- **Panels:** displays the Signal Panel screen.
- **SIPCO Screen:** displays the SIPCO State screen.
- **UCSConf:** displays UCSConf.

4.2.4 General Issues

By default the HMI starts with the screen of the main single line diagram configured. Other single line diagrams can be displayed clicking on the sub task buttons of the different single line diagrams or from the Main Menu screen options. Displays can be switched (single line diagram, panels, SIPCO, etc.) through the main menu, button pad and certain sub task buttons.

Screens are displayed until they are expressly changed.

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4.3 Single Line Diagram Page

After starting the HMI, the first screen displayed is the first single line diagram defined in configuration file "*unifilar.cfg*".

The purpose of the single line diagram screens is to graphically display in understandable manner the state and topology of a given substation. They consist of a number of dynamic and static objects arranged in such a way as to be able to grasp the substation topology and the state of the different devices. There will be as many single line diagrams as the user configures. As a general rule, substations are segregated into as many single line diagrams as voltage levels; therefore, there will be a single line diagram for the high voltage system and one or several diagrams for the medium voltage system.

Single line diagrams can be made up of a number of bays. Bay screens can be displayed to get data not shown in the single line diagram. Bay screens display in more detail the specific state of single line diagram bays.

Moreover, operations on the system are allowed. An internal interlock logic has been configured, such that if any blocking signal is active when a command is issued, a window will be displayed with the list of all command blocking signals. LEDs attached to list elements show whether said signals are taking part in command blocking (red = active signal, green = inactive signal). Commands are executed when no blockage is present.

Figures 4.7 and 4.8 show an example of a single line diagram and a specific bay of said diagram.

The appearance of the single line diagram is only a function of its configuration. Both the components and their arrangement in the screens are configured with the ***Zivergraph***® Single Line Diagram Editor. The single line diagram informs on the following issues:

- The Local / Remote state of the substation and the single line diagram.
- Topological display of the state of breakers, sectionalisers, reclosers and all substation control equipment.
- Display of voltage and current measurements. In case of insufficient space, this data might appear only in the bay.
- Display of the state of system devices.
- Display of substation meters..

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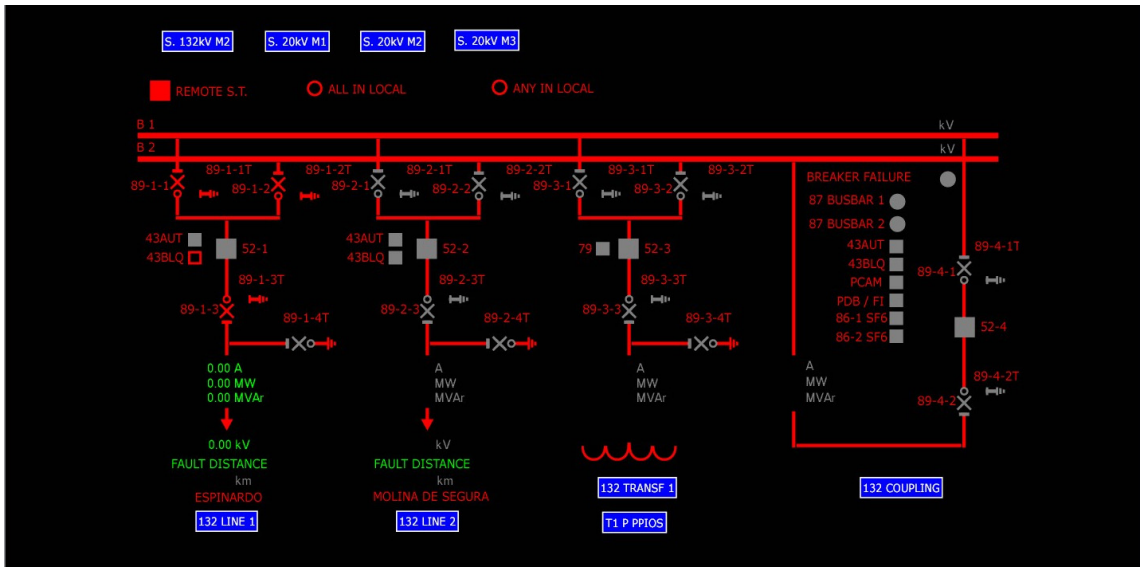

Figure 4.7: Single Line Diagram.

Figure 4.7 shows a single line diagram screen configured to display a number of objects located at points with specific coordinates so as to represent the high voltage single line diagram of the substation. Blue buttons with text inside allow switching to bays of the single line diagram or to other single line diagram screens.

Screen objects can be segregated into two main groups: static and dynamic.

- **Static**: objects with a single unchanged graphic display (buttons to switch to bays or single line diagram screens, labels, etc.).
- **Dynamic**: objects with changing graphic display depending on the state of associated signals (measurements, breakers, sectionalisers, etc.). The specific display depends on the object involved.

Dynamic objects feature a special associated display when the state of said objects is *unknown* (e.g., losing the connection to the device to which the object belongs); the display consists of a *grey* object

Bay screens show in more detail the specific state of single line diagram bays. Bays are displayed by clicking the switch to bay button (blue button with bay identifying text inside). Also, the main menu in section '**Unifilars**', includes a list of direct access to all system's single line diagram and bay pages.

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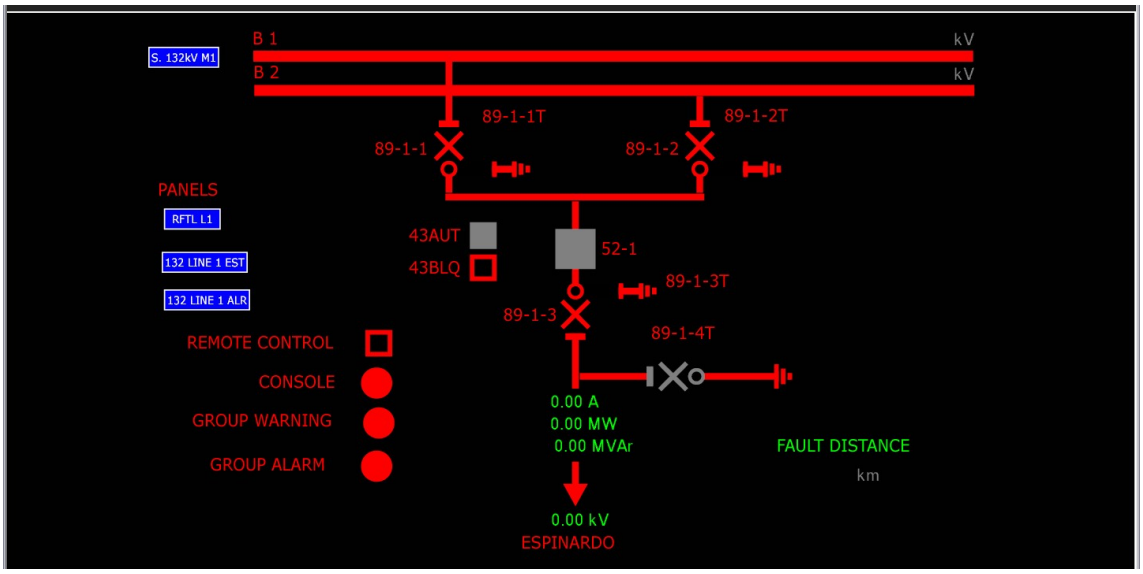

Figure 4.8: Bay Single Line Diagram.

Bay screens could also be provided with buttons for direct switching to bay signal panel.

4.3.1 Command Execution

There are certain objects, both in single line diagram screens and bay screens, on which commands can be executed. To this end, click on the component to be operated. When the pointer is placed over an interactive element, it changes from an arrow to a hand.

Clicking on interactive elements displays a window with all possible operations. This window includes all the operating commands that can be used for the selected object. The window name is the identifier of the component to be operated.

The figure below shows an example of command panel. In the panel it can be observed that four operations are possible for the switch.

Only one command can be selected from the list and a previous check is made prior to issuing the command to the SCU. For instance, selecting **CLOSE** and then clicking **Accept**, prior to sending the command to the **SCU,** all *interlocks* (signals that prevent the execution of a command depending on their state) associated to the command **CLOSE**, configured with the ***Zivergraph***® **Single Line Diagram Editor**, are checked.

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Interlocks can be configured for each element and command. Let us assume three interlocks have been configured that prevent this command from being executed, such as remote control, panel switched off or switch under lock out / tag out. In case no command interlock is active, it is sent to the **SCU**, which will at the same time send it to the applicable element. If any interlock is active, the command is not sent and the user is informed of the active interlock by means of a message.

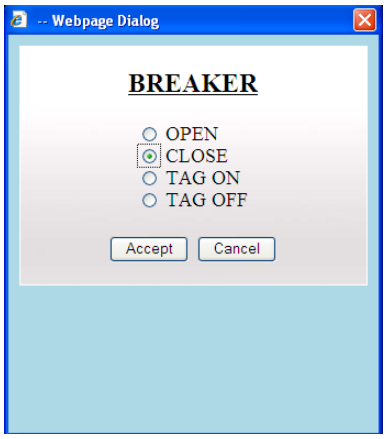

Figure 4.9: Command.

The **SCU**, at the same time, checks whether said command can be issued analysing the configured associated signals. If no blocks are detected on said command, it sends the command to the applicable element for command execution.

Besides, bay elements can have internal logic to block commands based on the state of certain signals. The command is sent to the **SCU** to check if the element has any active *interlock* that will stop the command. In case any interlock is active, the **SCU** responds to the command sent from the HMI with a message displaying a dialogue box with the state of the interlocks associated to the applicable command, so that the LEDs of active signals will be red and the rest green.

The interlocks panel will be specific for each element and command. This panel can be configured as it gathers the signals implicit to the internal logic of the element. The figure shows an example of the result of a close command to a switch already closed.

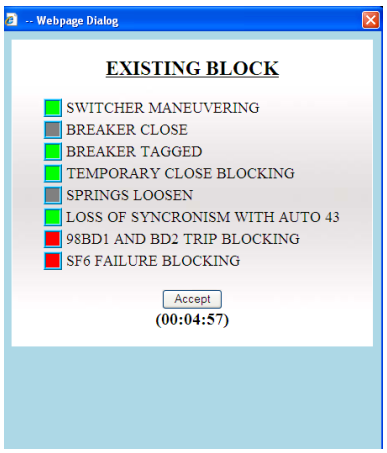

Figure 4.10: list of interlocks of a close command

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4.4 Main Menu

The Main Menu screen allows centralised access to the rest of screens, and also incorporates functions not directly related to the operation of substation elements.

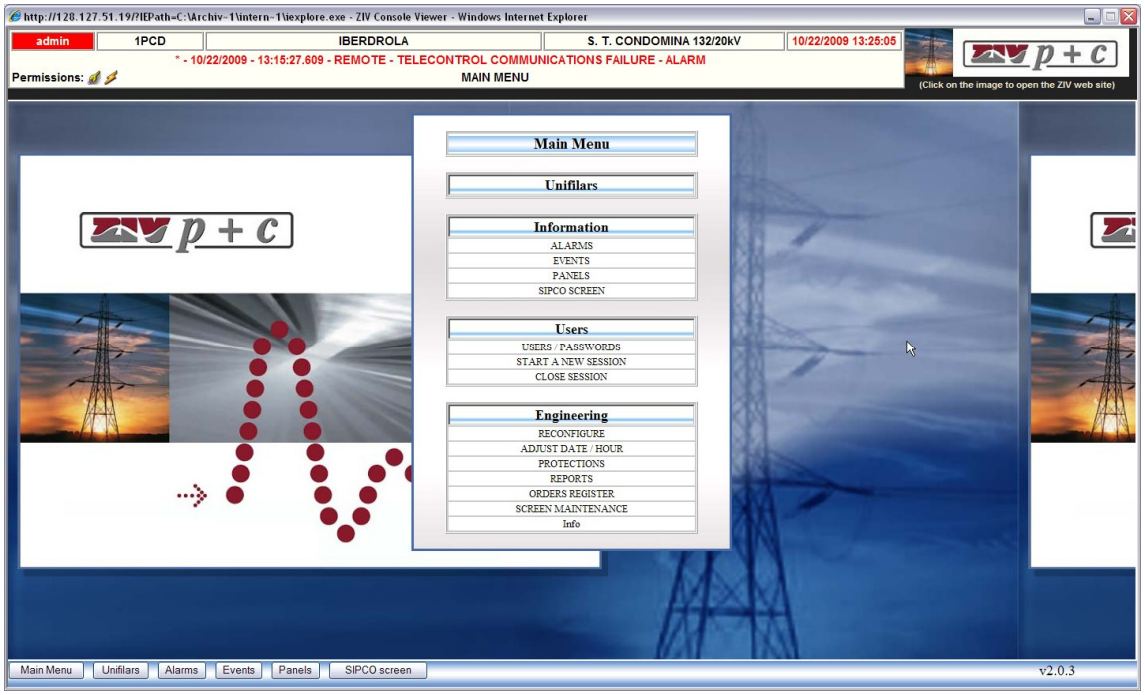

Figure 4.11: Page of the System Main Menu.

The main menu consists of five sections represented by their corresponding buttons. Clicking one of them expands a drop down list of options of the selected section. Click again the section button to hide the options. The figure shows expanded sections **Information**, **Users**, and **Engineering**.

Sections shown in the main menu have been configured into the system. For instance if, as shown in figure, H automation controllers are not configured into the system, said option is not shown in the menu.

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4.4.1 Section “Unifilars” (single line diagrams)

The figure shows the drop down list of the single line diagram section of a given substation. Single line diagrams that compose the substation appear on a blue background (‘**132kV System Module 1**’, ‘**20kV System Module 1**’,’ **20kV System Module 2**’, etc.).

Click the title of the single line diagram to drop down the list of all navigation options. Click again to hide the options. The figure shows the options of the single line diagram ‘**132kV System Module 1**’.

The first option (‘**General Unifilar’** on a blue background) displays the single line diagram page. All other options (on a white background) correspond to bays in the single line diagram and, therefore, will display the applicable bays. Clicking on other single line diagram button will display the associated options.

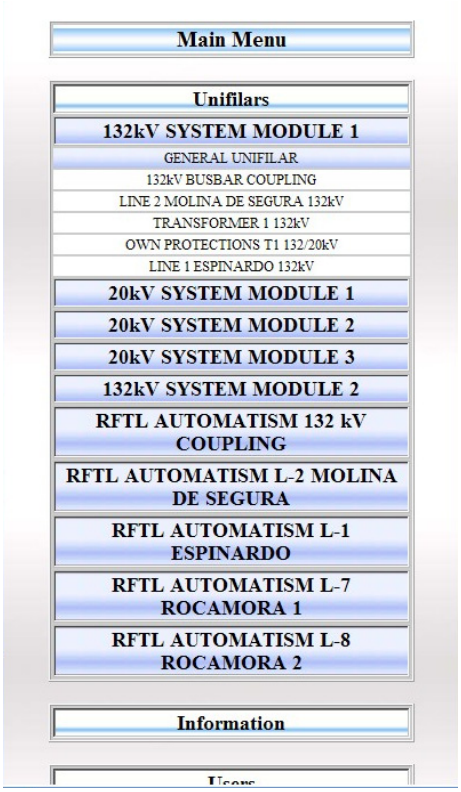

Figure 4.12: Main Menu: Unifilars.

4.4.2 Section ‘Information’

Available options are:

- **Alarms:** displays the alarms page.
- **Events:** displays the events page.
- **Panels:** displays the signal panel page.
- **SIPCO Screen:** displays the SIPCO state page.

4.4.3 Section ‘Configurations’

- **H / Y automation functions:** If adequate permissions have been granted, the user can gain access to the edit page of these schemes.

4.4.4 Section ‘Users’

Users and permissions can be configured through this section. Possible actions are:

- **Users / Passwords:** to create new users, delete current users, change permissions or establish the pre-defined user. Only users granted with administrator permission can gain access to this option.
- **Start a New Session:** to log on a new user. The user log on password will be requested.
- **Close Session:** to log out the current user and log on the default user. This action is automatically carried out if the active user remains inactive for a configured time.

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4.4.4.a User / Password Window

The user registration form consists of the following elements:

- **User.** Drop down list for editing a user.
- **Remove.** Deletes the user selected from the list. There must always be a user with administrator permission and a default user (can be the same), so that deletion will not be possible in case there is only one user with these properties.
- **Name.** Name of the user selected from the list. When you type in a name that is not in the list, it will be deemed a new user and will be added to the list

Figure 4.13: Page of the System Main Menu.

- **Default User.** After ticking this box, the current user becomes the pre-defined user. Any time the system is logged on, a pre-defined user session starts, so that granting permissions to this user is not recommended. There may only be one pre-defined user in the system, so that if the box is ticked, the current pre-defined user will cease to exist.
- **Password.** All users have an associated password, so that nobody can start a session with a given user without knowing the corresponding password. Said password is of no use in case of the pre-defined user.
- **Repaet.** Checks the password entered.
- **Execute Orders.** Grants the current user permission to execute commands, which confers him the capability to operate on the system.
- **Recognize alarms.** Grants the user the capability to acknowledge and erase system alarms.
- **Administrate Users.** Grants the selected user the capability to manage user registration among other tasks.
- **Automatisms and Applications.** Allows changing system settings and launching certain applications form the web client.
- **Modify User / Create User.** Click this button to save into the registry and turn into permanent all changes carried out on a user. If the user name does not appear in the current list, the button will show the text '**Create User**' instead of '**Modify User**' and will add a new user to the list. Clicking this button closes the window.
- **Cancel.** Closes the current window discarding all changes.

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4.4.5 Section Engineering

4.4.5.a Reconfiguration

Enforces the reconfiguration of the system from SCU files. Administrator permission is required to carry out this action.

Click the option to display a check dialogue box. Click '**Accept**' to start reconfiguring.

4.4.5.b Local / Remote

The web HMI can work in two modes. In **general** mode all clients have the same attributes (do not confuse clients with users and permissions. A client is any browser instance open against the HMI application no matter the associated permissions). In **local/remote** mode a web client, identified by its IP, acts as **local** client, the rest of clients being considered as **remote**.

When a **local/remote** system is in **local** mode, only the client defined as **local** can operate on the system. The rest of clients (**remote** clients) lack this capability no matter the attributions conferred by their permissions, as these permissions are disabled (this being reflected in the interface, in which **remote** client permission icons are translucent).

When the system is in **remote** mode, all clients have the capability to operate on the system (it being only limited by their active permissions) except if remote client operation blocking is configured (**RemoteClientsCannotExecuteOrders**). In this case remote clients cannot execute commands no matter the state of the system (although they can use the rest of permissions).

All clients with active command permission can switch the system from **remote** mode to **local** mode, but only the **local** client can switch a system from **local** mode to **remote** mode.

In systems with **local/remote** mode activated, this menu option opens a dialogue to switch the system state from **local** to **remote** and the opposite. If the **local/remote** mode is not activated, this option will not appear in the menu.

The **local/remote** state may only be changed if the system is linked to the SCU.

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4.4.5.c Date / Time Adjust Dialog

Central Units are generally synchronised by a GPS clock, so that date and time are updated periodically with data sent by this device. However, if date and time must be set manually (because there is no GPS clock or because there is an error), it can be done using this option. It is worth mentioning that in case a GPS clock is in operation, system time change will only be effective until a new update is received from said GPS. If the user wants to remove the GPS based time update, this must be done through the configuration files.

After selecting the date and time, click **Accept** to modify the system date and time.

Figure 4.14:Date / Time Adjust Dialog.

4.4.5.d UCSCONF

Displays the UCSConf window. In case UCSConf has not be configured in the system, this option will not appear in the menu.

4.4.5.a Protections

Allows launching external applications defined within the configuration section **Protections**. Click this option to display a window with all available applications. Just click the application for starting the same. In case there are no applications configured in the system, this option will not appear in the HMI menu.

4.4.5.b Measurements

Allows launching external applications defined within section **Measurements** in configuration files. Click this option to display a window with all available applications. Just click the application for starting the same. In case there are no applications configured in the system, this option will not appear in the HMI menu.

4.4.5.c Reports

Allows launching external applications defined within section **Reports** in configuration files. Click this option to display a window with all available applications. Just click the application for starting the same. In case there are no applications configured in the system, this option will not appear in the HMI menu.

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4.4.5.d Printer

This option will only appear if there is a printer configured in the system. Administrator permission is needed to operate the printer. The user may carry out two operations in the printer menu:

- **Purge printer.** Deletes from the printer list events pending printing, namely, after purging, only events occurring from that time will be printed.
- **Resend all events to printer.** Sends to the printer all events saved into the system, starting from the oldest.

4.4.5.e Orders Register

Opens the log file of all the operations carried out over the SCU through the HMI. This log is a text file where all the operations carried out by the users over the system are recorded.

Each action is saved in a line of the file together with the date / time in which it took place, identifier of the user that carried out the action, as well as the IP of the computer from which the operation was carried out. A typical annotation is shown in the following line.

04/12/2007 18:32:41.580 - admin (128.127.170.3) – Execution of Command '(7IRV* - L1-132kV) CLOSE SWITCH FROM UCS'.

The user can use the Windows explorer menu to save the action file, send the file to a printer, etc.

The Embedded Web HMI is designed to store by default the last 5000 operations carried out on the system, although this value can be configured by means of parameter **ConsoleRegisteredUsersActionsMaxNumber** of HMI configuration file '**ConsoleBaseConfig.xml**'.

4.4.5.f Screen Maintenance

This option is used to carry out maintenance operations on the tactile screen of a client computer. It disables the link to the HMI for 30 seconds, so that these operations can be carried safely with no interaction with the system.

A timer will show the time left for the system to activate again.

Disabling HMI interaction does not imply disabling the HMI. This will be active at any time recording any change produced in the system.

4.4.5.g Info

Shows data on HMI application and web client installed into the system. If UCSConf has been configured, version data will also be shown.

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4.4.5.h Printer

This option will only appear if there is a printer configured in the system. Administrator permission is needed to operate the printer. The user may carry out two operations in the printer menu:

- **Purge printer.** Deletes from the printer list events pending printing, namely, after purging, only events occurring from that time will be printed.
- **Resend all events to printer.** Sends to the printer all events saved into the system, starting from the oldest.

4.4.5.i Orders Register

Opens the log file of all the operations carried out over the SCU through the HMI. This log is a text file where all the operations carried out by the users over the system are recorded.

Each action is saved in a line of the file together with the date / time in which it took place, identifier of the user that carried out the action, as well as the IP of the computer from which the operation was carried out. A typical annotation is shown in the following line.

04/12/2007 18:32:41.580 - admin (128.127.170.3) – Execution of Command '(7IRV* - L1-132kV) CLOSE SWITCH FROM UCS'.

The user can use the Windows explorer menu to save the action file, send the file to a printer, etc.

The Embedded Web HMI is designed to store by default the last 5000 operations carried out on the system, although this value can be configured by means of parameter **ConsoleRegisteredUsersActionsMaxNumber** of HMI configuration file '**ConsoleBaseConfig.xml**'.

4.4.5.j Screen Maintenance

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A timer will show the time left for the system to activate again.

Disabling HMI interaction does not imply disabling the HMI. This will be active at any time recording any change produced in the system.

4.4.5.k Info

Shows data on HMI application and web client installed into the system. If UCSConf has been configured, version data will also be shown.

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4.5 Panel List Page

The purpose of the panel list screen is to display the state of some digital signals arranged by bays or devices.

A first screen, bay summary (panel list), displays a summary of the state of bay signals. As many panel buttons as have been configured are displayed. Buttons show identifying texts of bays or devices.

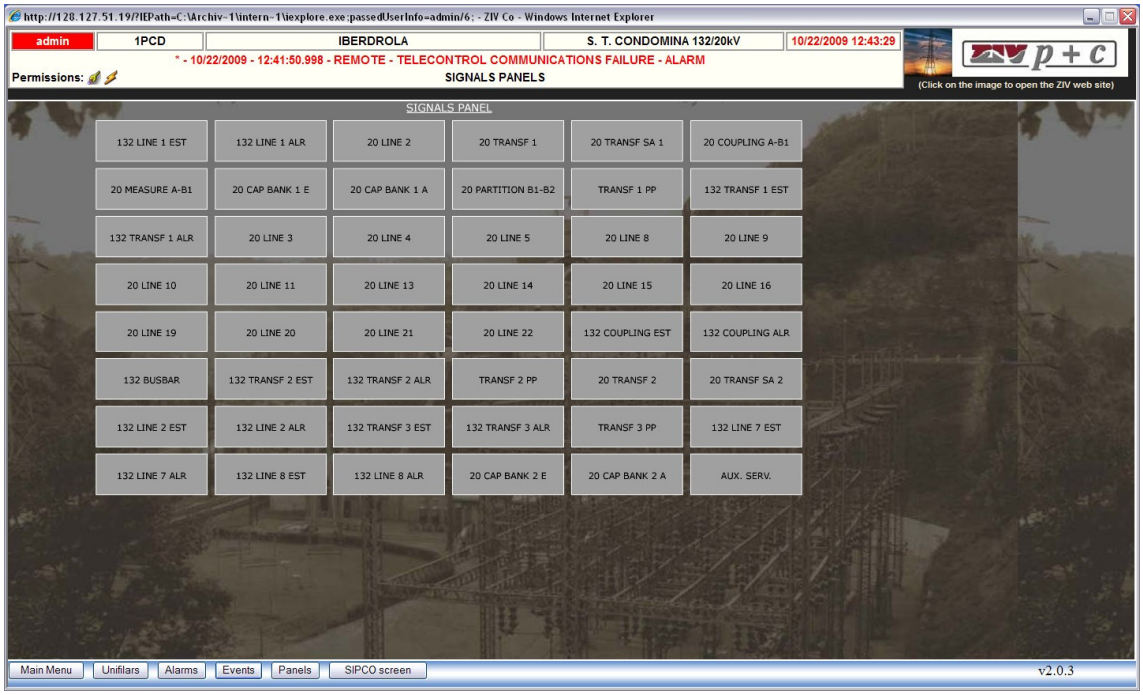

Figure 4.15: Panel List Screen.

A colour code is used to find out at first glance in the panel list, signal active states, alarms or communications failure.

- If any panel button is *solid gray*, it means that current communications with the device referred to in the panel button is not established or the state of some of the signals it includes is invalid.
- If the panel button is *green*, all panel signals are deactivated or set to zero (0).
- If the panel button is *red*, some panel signals are active or set to (1).
- Finally, digital signals constituting the panel might or might not act as alarms. If there are any unacknowledged signals configured as alarms in the alarm list, the panel button will *flash*. Alarms can only be acknowledged from each panel, not from the panel list page.

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Click the panel list page button to display the specific signal panel similar to the one shown in the picture below.

Figure 4.16: Bay Signal Panel.

The panel consists of a list of LEDs that inform of the state of the associated signal, identified with a text to the right of the applicable LED.

All signal panels are different and have as many LEDs as have been configured. These LEDs are grouped into three different categories:

- **Indications**. This category is made of signals corresponding to field digital inputs associated to the bay topology, device states, etc. Activation of any signal belonging to this group can be an alarm, therefore this attribute can be highlighted with a flashing LED when the signal turns up. To this end, the signal shall be assigned the alarm category when creating the panel. (Example: the breaker unknown state is an alarm within Indications).
- **Protections**. Within this category are those digital signals captured directly from the field, via digital inputs or device internal states, associated to protection tripping. These are included into this group for panel clarity.
- **Alarms**. Within this category are the signals assigned to the system with alarm category. Therefore, apart from displaying the state of the signal, the acknowledgement state is also displayed.

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Signals can be within any category. The criterion of signal grouping into categories is only for signal display clarity.

Click '**Recognize'** to acknowledge the flashing signals, no matter the group they belong to. This acknowledges both signal panel alarms and system list alarms.

A button may appear in the signal panel to display the single line diagram of the associated bay (button **OWN PROTECTIONS T3 132/20kV** in picture). For this button to appear in a panel, a reciprocal button must exist in the associated single line diagram, namely, a button must be configured into the single line diagram of the associated bay to display the signal panel.

The same as for the summarised bay signal panel, in this screen a colour code is also used to show the state of the signals. The following criterion is used:

- If the LED is *green* and the signal it represents is not an alarm, it means the signal is deactivated. If it is *red*, the signal is activated.
- If the signal falls into the alarm category, red and green stand for the same meaning, but the LED could or could not flash depending on whether the alarm is or is not acknowledged in the alarm list.
- If there is a broken ling to the **SCU**, associated devices or if the signal is in invalid state, panel LEDs will be *grey*. This criterion is common to the whole application.

Note: screen topology changes in case there are no states, protections or alarms to display, and the frame corresponding to the non-existent group is deleted.

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4.6 Alarm Page

The alarm page consists of a number of text lines showing changes in signals configured as alarms. The text formal shown in alarm and event pages is the same. Text lines are either alarms or events. The line format is as follows:

1	2	3	4	5	6
*	10/22/2009	13:15:27.609	15 52-4 L-4	Remote Telecontrol Communications Failure	Alarm

Field 1: user-configurable alphanumeric character showing the type of alarm. Default values are:

- **‘ ‘** *Normal* alarm with valid date and time.
- **✱** *Normal* alarm with date and time likely incorrect either because of lack of synchronism or because the **SCU** is not GPS synchronised.
- **R** Alarm generated by *redundancy* tasks with valid date and time.
- **r** Alarm generated by *redundancy* tasks with date and time likely incorrect either because of lack of synchronism or because the **SCU** is not GPS synchronised.
- **I** *Internal* alarm (not coming from any device, but internally generated in the **SCU** by simulation or data coherence mechanism) with valid date and time.
- **i** *Internal* alarm not coming from any device, with date and time likely incorrect either because of lack of synchronism or because the **SCU** is not GPS synchronised.
- **?** *Unidentified* alarm with valid date and time.
- **¿** *Unidentified* alarm with date and time likely incorrect either because of lack of synchronism or because the **SCU** is not GPS synchronised.

Field 2: date in which the alarm occurred. Format: day / month / year.
Field 3: time in which the alarm occurred. Accurate to the thousandth.
Field 4: descriptive text of the device detecting the alarm. The following data can for instance be written into this field: line voltage first, then the description of the field element to which the alarm is associated to and finally the line name (15 52-4 L-4).
Field 5: signal description (for instance, loose springs).
Field 6: signal state (normal, activated, alarm, etc.).

Field texts are user configurable through ***Zivergraph***® software so they can look different from what has been explained, although with the same meaning.

This screen can display three types of alarms. The table below shows them with their default colours:

Type	Alarms	Text	Background
Type 1	Active unacknowledged	White	Red
Type 2	Active acknowledged	Red	Black
Type 3	Inactive	White	Black

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Alarm entry colours are also user configurable, so they can differ in case of changes.

The Alarm screen consists of 10 pages with 25 alarms each by default, therefore the last 250 system alarms are saved. When the alarm list reaches the maximum configured size, a new system alarm will cause the removal of the oldest alarm. Switching off the HMI does not imply missing alarms, as they will be saved by the **SCU**.

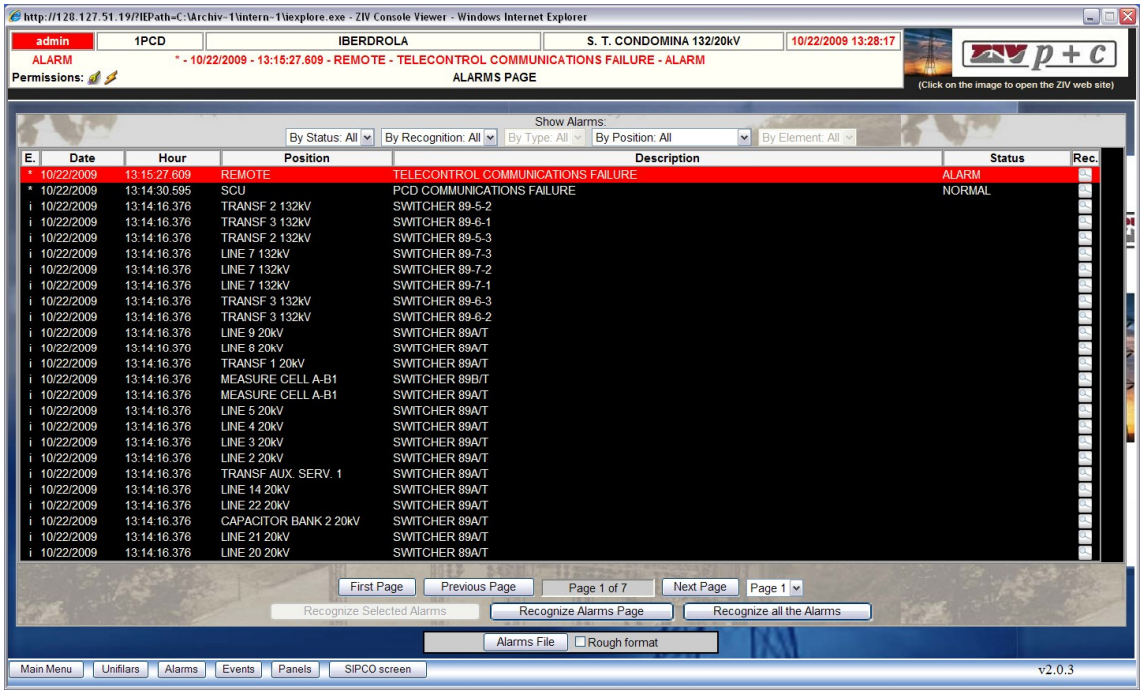
http://128.127.51.19/?IEPath=C:\Archiv-1\intern-1\iexplore.exe - ZIV Console Viewer - Windows Internet Explorer
admin
1PCD
IBERDROLA
S. T. CONDOMINA 132/20kV
10/22/2009 13:28:17
ALARM
* - 10/22/2009 - 13:15:27.609 - REMOTE - TELECONTROL COMMUNICATIONS FAILURE - ALARM
Permissions:
ALARMS PAGE
(Click on the image to open the ZIV web site)
Show Alarms:
By Status: All
By Recognition: All
By Type: All
By Position: All
By Element: All
E. Date Hour Position Description Status Rec.
* 10/22/2009 13:15:27.609 REMOTE TELECONTROL COMMUNICATIONS FAILURE ALARM
* 10/22/2009 13:14:30.595 SCU PCD COMMUNICATIONS FAILURE NORMAL
i 10/22/2009 13:14:16.376 TRANSF 2 132kV SWITCHER 89-5-2
i 10/22/2009 13:14:16.376 TRANSF 3 132kV SWITCHER 89-6-1
i 10/22/2009 13:14:16.376 TRANSF 2 132kV SWITCHER 89-5-3
i 10/22/2009 13:14:16.376 LINE 7 132kV SWITCHER 89-7-3
i 10/22/2009 13:14:16.376 LINE 7 132kV SWITCHER 89-7-2
i 10/22/2009 13:14:16.376 LINE 7 132kV SWITCHER 89-7-1
i 10/22/2009 13:14:16.376 TRANSF 3 132kV SWITCHER 89-6-3
i 10/22/2009 13:14:16.376 TRANSF 3 132kV SWITCHER 89-6-2
i 10/22/2009 13:14:16.376 LINE 9 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 8 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 TRANSF 1 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 MEASURE CELL A-B1 SWITCHER 89B/T
i 10/22/2009 13:14:16.376 MEASURE CELL A-B1 SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 5 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 4 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 3 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 2 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 TRANSF AUX. SERV. 1 SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 14 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 22 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 CAPACITOR BANK 2 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 21 20kV SWITCHER 89A/T
i 10/22/2009 13:14:16.376 LINE 20 20kV SWITCHER 89A/T
First Page
Previous Page
Page 1 of 7
Next Page
Page 1
Recognize Selected Alarms
Recognize Alarms Page
Recognize all the Alarms
Alarms File
Rough format
Main Menu
Unifilars
Alarms
Events
Panels
SIPCO screen
v2.0.3

Figure 4.17: Alarm Page.

When alarms occur they are entered in alarm list as unacknowledged active alarms. Then there are two possibilities: the user acknowledges it or the cause for the alarm disappears. If the alarm is acknowledged, this is entered into the alarm list as acknowledged active alarm and switches to inactive alarm when the cause for the alarm disappears. However, if the cause for the alarm disappears before it is acknowledged, it is entered as inactive alarm. Acknowledging operations Acknowledging alarms does not modify their time labels.

Alarm messages will be deleted from the alarm list when acknowledged and deactivated. When alarms are acknowledged, they switch to *acknowledged active* alarms if they are active and they are deleted from the list if they are inactive. This implies that both alarm activation and deactivation are considered.

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4.6.1 Alarm Selection

- To select an alarm left click on it.
- For multiple alarm selection keep **Control** (CTRL) key pressed. Every time an alarm is clicked it is added to the list of selected alarms (or deleted from the selection if it were already selected).
- To select an alarm block select the first alarm of the block in the normal way and then keep the **SHIFT** key while selecting the last alarm of the block. This will add to the selection all the alarms placed between the first and the last alarms (both included).

Click on any part of the screen except alarms to undo the current selection. Pressing **Esc** also cancels the current selection.

When alarms are selected the alarm background colour gets lighter, switching from black to grey or from red to pink (although all colours can be changed through the configuration files). This allows discerning at a first glance current selected alarms.

Only current page alarms can be selected. Any selection will be cancelled when switching alarm pages.

Certain alarm page operations can only be carried out if alarms are selected. Command buttons will be disabled or hidden if no selection is made.

4.6.2 Alarm Filter

A number of drop down lists on the upper part of the alarm page allow to establish which alarms must be displayed on the page. These filters are based on different criteria:

- **By State. All** alarms, only **active** alarms or only **inactive** alarms can be displayed. **All** does not imply all the alarms are displayed, but that current filter criteria are not taken into account at the time when the alarms to be displayed are determined. This criterion is followed for all page filters.
- **By Acknowledgement. All** alarms, only **acknowledged** alarms or only **unacknowledged** alarms can be displayed.
- **By Type.** Disabled.
- **By Bay.** Allows selecting one system bay so that only alarms linked to the bay are displayed.
- **By Element.** Disabled.

For instance, selecting **Active** from the state filter and **OWN PROTECTIONS T3 132/20kV** from the bay filter, displays only active alarms in said bay. As the acknowledgement criterion has not been included (the acknowledgement filter shows the value **all**), both acknowledged and unacknowledged alarms will be displayed.

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4.6.3 Navigation through Alarm Pages

A number of elements below the alarm list allow the user to navigate through the different alarm pages. Said elements are from left to right:

- **First Page.** Displays the first page of the alarm list, namely, the last alarms received by the system.
- **Previous Page.** Displays the previous page.
- **Actual Page / Number of Pages.** This text informs on the current page and the total number of alarm pages currently available.
- **Next Page.** Displays the next page of the alarm list.
- **Page List**. This drop down list allows selecting directly the page to be displayed.

4.6.4 Alarm Acknowledgement

There are four different modes for alarm acknowledgement:

- **Single.** Acknowledgeable alarms have a small icon to the right end. Clicking this icon acknowledges the alarm.
- **Selection.** This option will be disabled until alarm selection. Clicking **Recognize Selected Alarms** button acknowledges all selected alarms.
- **Page.** Clicking **Recognize Alarms Page** acknowledges all current page alarms.
- **All.** Clicking **Recognize all the Alarms** acknowledges all the alarms on the list, whether they belong to the current alarm page or not.

4.6.5 Alarm Deletion

Alarms are selected for deletion keeping **CTRL+ALT** pressed and clicking the alarms to be deleted. When selecting alarms for deletion, button text '**Recognize Alarms**' will be replaced by '**Delete Alarms**'. Alarm selection for deletion colours are different from alarm selection for acknowledgement colours. Both colour groups are user configurable.

Clicking '**Delete Alarms**' button displays a dialogue box requesting confirmation. After confirming, the selected alarms are deleted from the list.

Note: same as for other operations, alarm operations are reflected into the log file, so that the alarms deleted from the list and the time at which this happened can be checked at any time.

4.6.6 Alarm File

Clicking '**Alarms File**' displays a window with the text file containing current system alarms. This file can be written into the client computer or dump it to a printer using Internet Explorer menu commands. Ticking the box **Rough format**, the same list is displayed but with fields separated by commas, which can be useful to display the file using certain applications.

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4.7 Event Page

Event screens constitute a chronological record of all signal changes (referred to as events) in a substation.

Event text formats are the same than for alarms. Event storage file capacity can be configured through parameter **MaxNumSuc**. The last 500 events are saved by default. Events are segregated into pages of 25 events each, the number of which varies as a function of the number of configured events. These signal changes may or may not be arranged chronologically.

If the list contains already a number of events equal to **MaxNumSuc**, new events will be entered into the list deleting the oldest event. The event with the oldest time label will not be deleted but the first of the **MaxNumSuc** events saved. Figure 4.18 shows an event page:

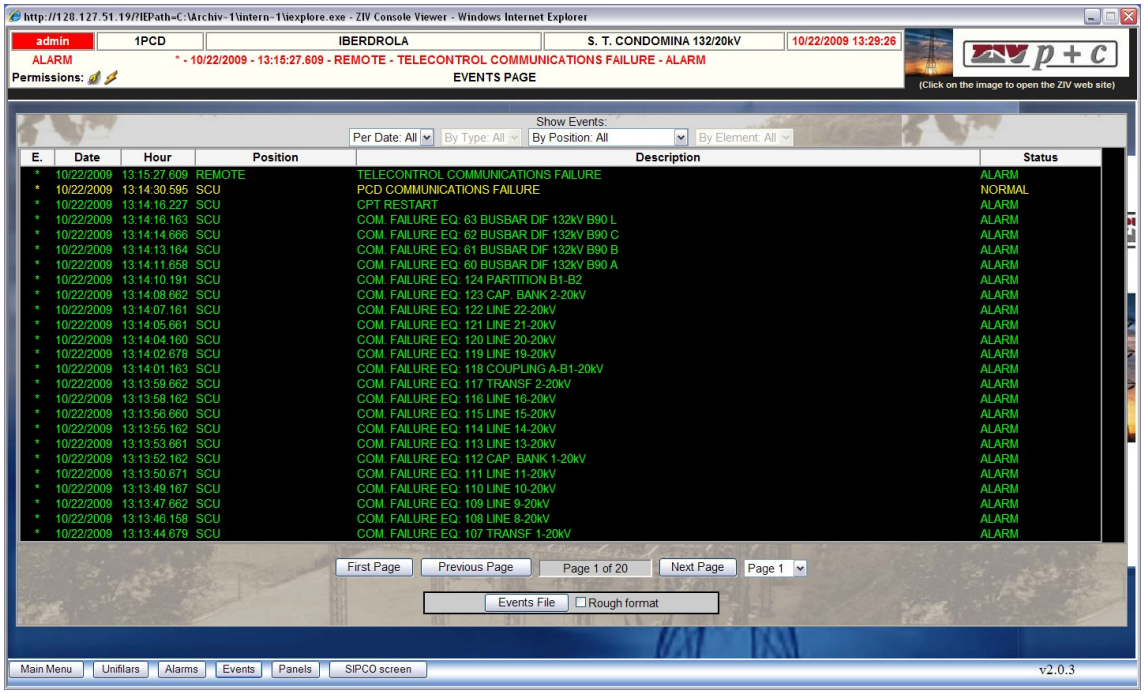
admin
1PCD
IBERDROLA
S. T. CONDOMINA 132/20kV
10/22/2009 13:29:26
ALARM
* - 10/22/2009 - 13:15:27.609 - REMOTE - TELECONTROL COMMUNICATIONS FAILURE - ALARM
Permissions:
EVENTS PAGE
(Click on the image to open the ZIV web site)
Show Events:
Per Date: All
By Type: All
By Position: All
By Element: All
E. Date Hour Position Description Status
* 10/22/2009 13:15:27.609 REMOTE TELECONTROL COMMUNICATIONS FAILURE ALARM
* 10/22/2009 13:14:30.595 SCU PCD COMMUNICATIONS FAILURE NORMAL
* 10/22/2009 13:14:16.227 SCU CPT RESTART ALARM
* 10/22/2009 13:14:16.163 SCU COM. FAILURE EQ: 63 BUSBAR DIF 132kV B90 L ALARM
* 10/22/2009 13:14:14.666 SCU COM. FAILURE EQ: 62 BUSBAR DIF 132kV B90 C ALARM
* 10/22/2009 13:14:13.164 SCU COM. FAILURE EQ: 61 BUSBAR DIF 132kV B90 B ALARM
* 10/22/2009 13:14:11.658 SCU COM. FAILURE EQ: 60 BUSBAR DIF 132kV B90 A ALARM
* 10/22/2009 13:14:10.191 SCU COM. FAILURE EQ: 124 PARTITION B1-B2 ALARM
* 10/22/2009 13:14:08.662 SCU COM. FAILURE EQ: 123 CAP. BANK 2-20kV ALARM
* 10/22/2009 13:14:07.161 SCU COM. FAILURE EQ: 122 LINE 22-20kV ALARM
* 10/22/2009 13:14:05.661 SCU COM. FAILURE EQ: 121 LINE 21-20kV ALARM
* 10/22/2009 13:14:04.160 SCU COM. FAILURE EQ: 120 LINE 20-20kV ALARM
* 10/22/2009 13:14:02.678 SCU COM. FAILURE EQ: 119 LINE 19-20kV ALARM
* 10/22/2009 13:14:01.163 SCU COM. FAILURE EQ: 118 COUPLING A-B1-20kV ALARM
* 10/22/2009 13:13:59.662 SCU COM. FAILURE EQ: 117 TRANSF 2-20kV ALARM
* 10/22/2009 13:13:58.162 SCU COM. FAILURE EQ: 116 LINE 16-20kV ALARM
* 10/22/2009 13:13:56.660 SCU COM. FAILURE EQ: 115 LINE 15-20kV ALARM
* 10/22/2009 13:13:55.162 SCU COM. FAILURE EQ: 114 LINE 14-20kV ALARM
* 10/22/2009 13:13:53.661 SCU COM. FAILURE EQ: 113 LINE 13-20kV ALARM
* 10/22/2009 13:13:52.162 SCU COM. FAILURE EQ: 112 CAP. BANK 1-20kV ALARM
* 10/22/2009 13:13:50.671 SCU COM. FAILURE EQ: 111 LINE 11-20kV ALARM
* 10/22/2009 13:13:49.167 SCU COM. FAILURE EQ: 110 LINE 10-20kV ALARM
* 10/22/2009 13:13:47.662 SCU COM. FAILURE EQ: 109 LINE 9-20kV ALARM
* 10/22/2009 13:13:46.158 SCU COM. FAILURE EQ: 108 LINE 8-20kV ALARM
* 10/22/2009 13:13:44.679 SCU COM. FAILURE EQ: 107 TRANSF 1-20kV ALARM
First Page
Previous Page
Page 1 of 20
Next Page
Page 1
Events File
Rough format
Main Menu
Unifilars
Alarms
Events
Panels
SIPCO screen
v2.0.3

Figure 4.18: Event Page.

When configuring substation signals, each device signal must be configured whether to go into the alarm list or event list. Also, whether entering signal leading edges or trailing edges must be defined.

Default colours for event entries are defined below:

- *Positive edge* events (activation): no background colour and green test.
- *Negative edge* events (deactivation): no background colour and yellow test.

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4.7.1 Event Filters

Same as for the alarm page, a number of drop down lists on the upper part of the event page allow to establish which events must be displayed on the page. These filters are based on different criteria:

- **Events by date.** Allows selecting a date interval such that the events displayed belong to said interval. Options are:
  - **All.** Ignores this filtering criterion.
  - **Select.** Clicking this option displays a dialogue box to select start date / time => end date / time. After this selection, only events between both dates (inclusive) will be displayed.
  - **Start Date / Time => End Date / Time.** A list of events within the last selected interval is displayed. When selecting a new interval, the text of this option will switch to display the new interval.
- **Events by Type.** Disabled.
- **Events by Bay.** Allows selecting one of the bays defined in the system such that only events related to that bay are displayed.
- **Events by Element.** Disabled.

4.7.2 Navigating through Event Pages

Same as for the alarm page, a number of elements below the event list allow the user to navigate through the different event pages. Said elements are from left to right:

- **First Page.** Displays the first page of the event list, namely, the last events received by the system.
- **Previous Page.** Displays the previous page
- **Actual Page / Number of Pages.** This text informs on the current page and the total number of event pages currently available.
- **Next Page.** Displays the next page of the event list.
- **Page List.** This drop down list allows selecting directly the page to be displayed.

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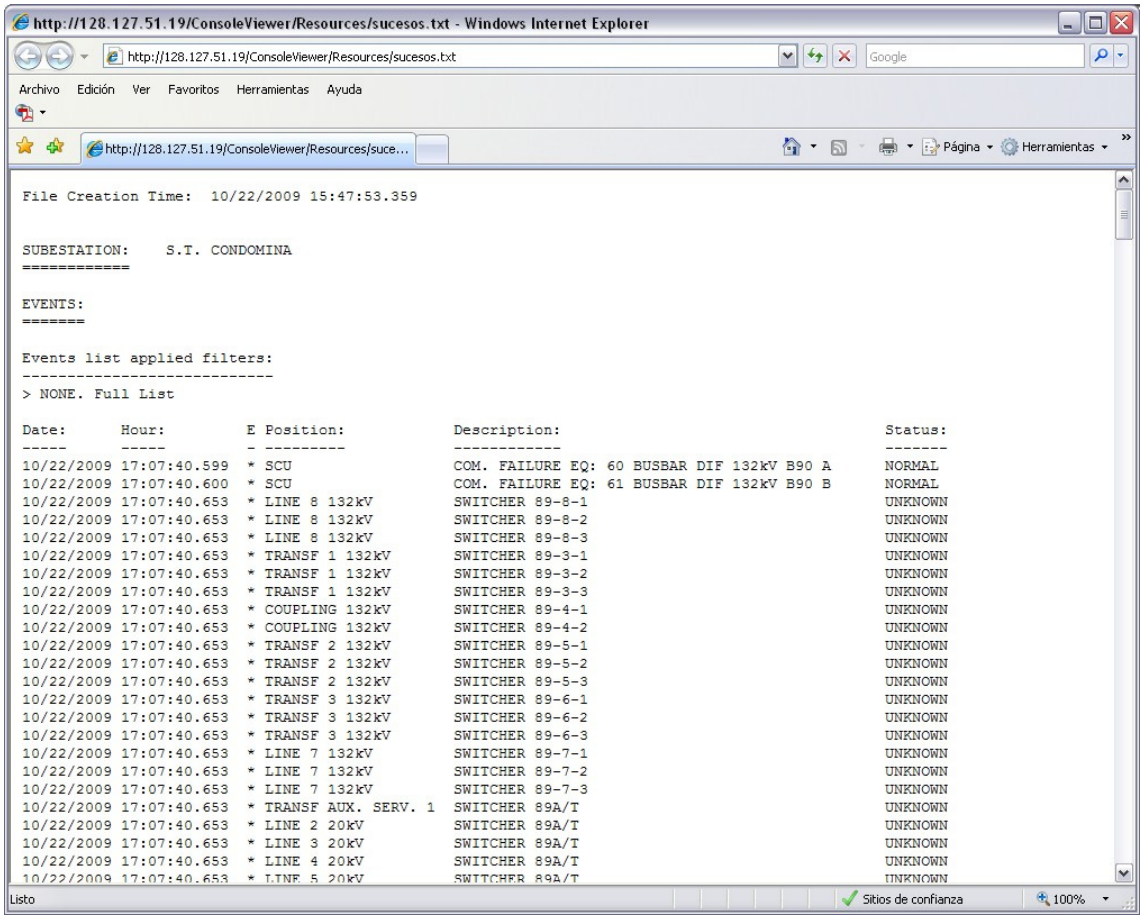
4.7.3 Event File

Clicking **Events File** displays a window with the text file containing current system events. This file can be written into the client computer or dump it to a printer using Internet Explorer menu commands.

Ticking the box **Rough format**, the same list is displayed but with fields separated by commas, which can be useful to display the file using certain applications.

For the event page, the list in the file will not be the complete system event list, but the list corresponding to current selected event filters. Therefore, apart from the date and time created, the file header shows the filters that have been applied.




```
File Creation Time:  10/22/2009 15:47:53.359


SUBESTATION:    S.T. CONDOMINA
============

EVENTS:
=======

Events list applied filters:
----------------------------
> NONE. Full List

Date:      Hour:         E Position:           Description:                                Status:
-----      -----         - ---------           ------------                                -------
10/22/2009 17:07:40.599  * SCU                 COM. FAILURE EQ: 60 BUSBAR DIF 132kV B90 A  NORMAL
10/22/2009 17:07:40.600  * SCU                 COM. FAILURE EQ: 61 BUSBAR DIF 132kV B90 B  NORMAL
10/22/2009 17:07:40.653  * LINE 8 132kV        SWITCHER 89-8-1                             UNKNOWN
10/22/2009 17:07:40.653  * LINE 8 132kV        SWITCHER 89-8-2                             UNKNOWN
10/22/2009 17:07:40.653  * LINE 8 132kV        SWITCHER 89-8-3                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 1 132kV      SWITCHER 89-3-1                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 1 132kV      SWITCHER 89-3-2                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 1 132kV      SWITCHER 89-3-3                             UNKNOWN
10/22/2009 17:07:40.653  * COUPLING 132kV      SWITCHER 89-4-1                             UNKNOWN
10/22/2009 17:07:40.653  * COUPLING 132kV      SWITCHER 89-4-2                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 2 132kV      SWITCHER 89-5-1                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 2 132kV      SWITCHER 89-5-2                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 2 132kV      SWITCHER 89-5-3                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 3 132kV      SWITCHER 89-6-1                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 3 132kV      SWITCHER 89-6-2                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF 3 132kV      SWITCHER 89-6-3                             UNKNOWN
10/22/2009 17:07:40.653  * LINE 7 132kV        SWITCHER 89-7-1                             UNKNOWN
10/22/2009 17:07:40.653  * LINE 7 132kV        SWITCHER 89-7-2                             UNKNOWN
10/22/2009 17:07:40.653  * LINE 7 132kV        SWITCHER 89-7-3                             UNKNOWN
10/22/2009 17:07:40.653  * TRANSF AUX. SERV. 1 SWITCHER 89A/T                              UNKNOWN
10/22/2009 17:07:40.653  * LINE 2 20kV         SWITCHER 89A/T                              UNKNOWN
10/22/2009 17:07:40.653  * LINE 3 20kV         SWITCHER 89A/T                              UNKNOWN
10/22/2009 17:07:40.653  * LINE 4 20kV         SWITCHER 89A/T                              UNKNOWN
10/22/2009 17:07:40.653  * LINE 5 20kV         SWITCHER 89A/T                              UNKNOWN
```

Figure 4.19: Event Files.

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4.8 SIPCO State Page

This screen displays all SIPCO (Integrated Protection and Control System) devices, showing in real time the state of operation of every device integrated into the communications network, such as:

- State of every system UCP.
- State of **SCU** links to remote control, HMI, GPS clock and printer (provided these options are available).

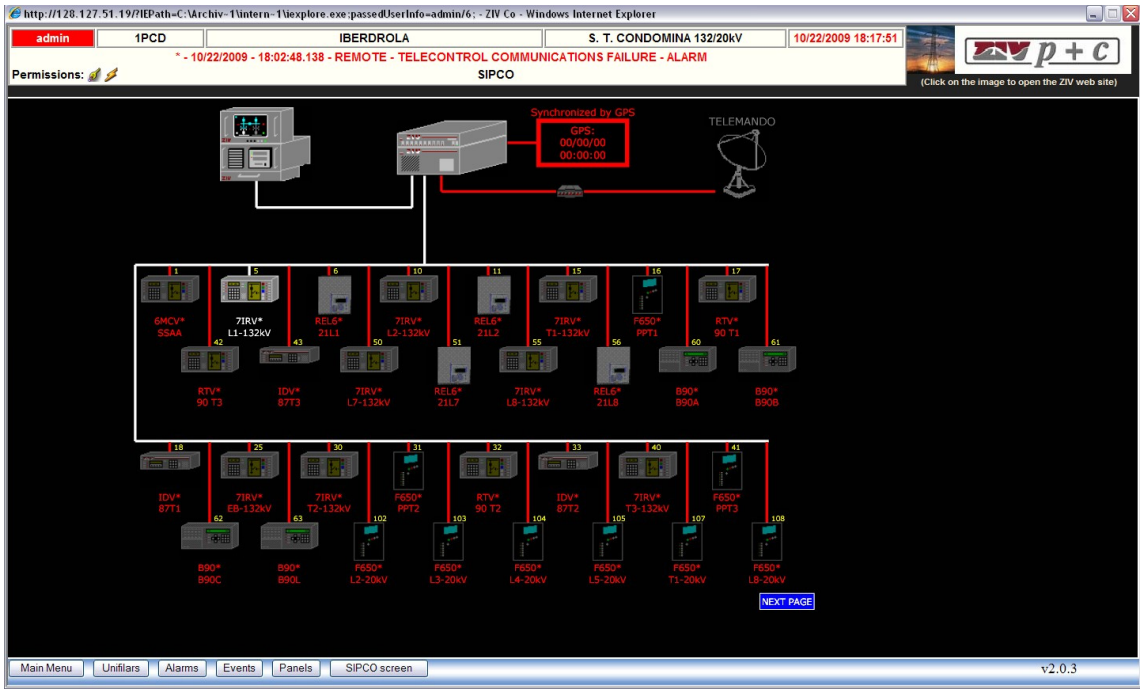

Figure 4.20: Integrated Control and Protection System.

As shown in figure 4.20, the Central Unit and (**SCU**) and the Embedded HMI are linked. Although they are not hard wired, as both belong to the same device, they are depicted as shown in the figure to indicate the state of the link between both applications. If no link is established between each other, the connecting line between both devices will be *red* and the rest of the system will be depicted in *grey*, which means lack of information on the rest of elements. Take into account that the SIPCO state represents the state of the links to the devices as seen for the HMI.

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If the link between **CWE** and the central unit is correct, the connecting line between both is *white and* all system elements are represented according to the state of the link to the central unit. Following the same criterion used up to now, if the link to any element fails, this remains *dark grey* and, to highlight the error state, its label and link to the communications system turns *red*. If no link failure occurs, the element is clearly represented in its native colour and its link to the communications system and label will be *white*. The picture shows only the first device in a state of communications failure.

On the other hand, communications with the GPS clock also has additional information. When communications with the GPS is established and it is synchronised with the **SCU**, both line and box are green. If communications is not established, they are drawn in red (image). When communications with the GPS clock is established but no synchronism with the system is established because synchronism error, they are drawn in *blue*.

Substation device data are as follows:

- Device **Address**: Physical device address.
- Device **Description**: Defines the type of device (for instance, device model).
- Device **Bay**: Defines the bay in which the device is located, for instance, voltage and name of the line to which the device is associated.

Figure 4.21 shows these fields, the device being 6MCDH7K of address 10 located in line 45 kV RE-1.

The SIPCO first page can display 32 devices. If the number of devices exceeds this value, the rest of devices will be displayed in the next pages. After the first, each page has capacity for 48 devices.

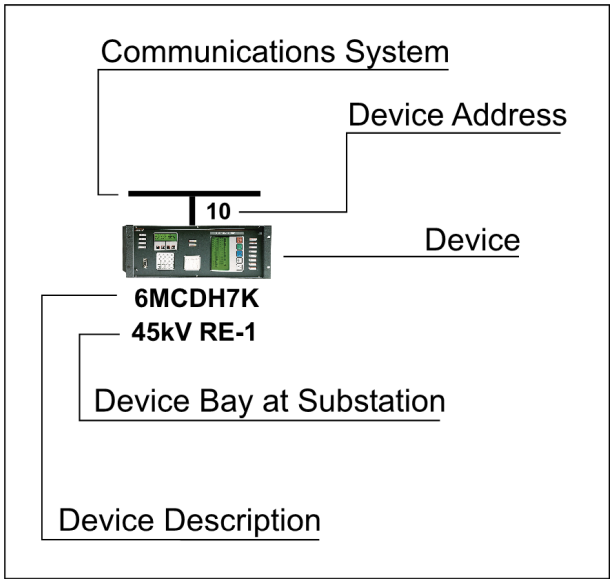

Figure 4.21: Device Description.

Navigation through the SIPCO is carried out using the buttons located at the bottom right corner (buttons **Previous Page**, **Next Page**). If there are less than 33 devices in the system these buttons will not be displayed as only the first page is needed to represent the substation.

Note: when the UCSConf is configured into the system, it can be directly displayed through an SIPCO screen sub task button.

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4.9 H and Y Automation Functions

H and Y Automation settings window can be displayed from the start menu (**Configurations -> AUTOMATISM -> H CONFIGURATION AUTOMATIC CONTROL**).

When this page is requested, the web client requests to the HMI application the settings values configured into the system. The screen below is displayed upon receipt of the settings values (figure 4.22), which allows configuring the H automation function (if one of the two busbars is missing Y Automation will be displayed).

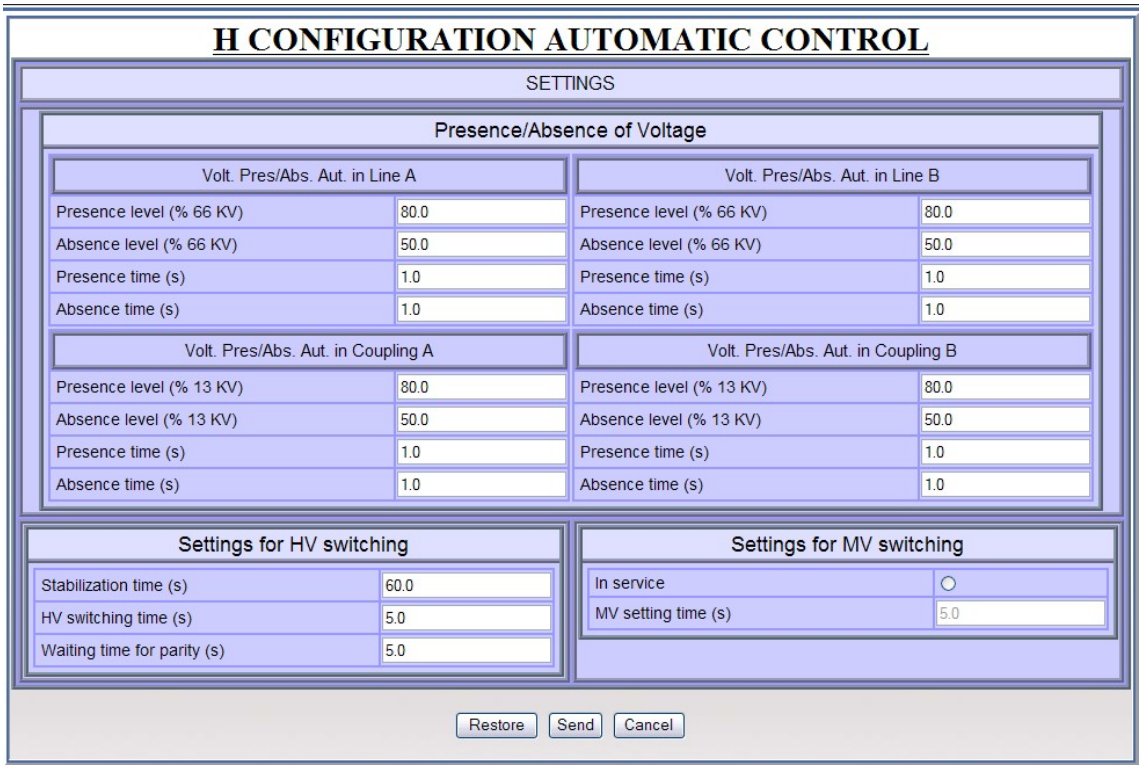
H CONFIGURATION AUTOMATIC CONTROL
SETTINGS
Presence/Absence of Voltage
Volt. Pres/Abs. Aut. in Line A
Presence level (% 66 KV) 80.0
Absence level (% 66 KV) 50.0
Presence time (s) 1.0
Absence time (s) 1.0
Volt. Pres/Abs. Aut. in Line B
Presence level (% 66 KV) 80.0
Absence level (% 66 KV) 50.0
Presence time (s) 1.0
Absence time (s) 1.0
Volt. Pres/Abs. Aut. in Coupling A
Presence level (% 13 KV) 80.0
Absence level (% 13 KV) 50.0
Presence time (s) 1.0
Absence time (s) 1.0
Volt. Pres/Abs. Aut. in Coupling B
Presence level (% 13 KV) 80.0
Absence level (% 13 KV) 50.0
Presence time (s) 1.0
Absence time (s) 1.0
Settings for HV switching
Stabilization time (s) 60.0
HV switching time (s) 5.0
Waiting time for parity (s) 5.0
Settings for MV switching
In service
MV setting time (s) 5.0
Restore
Send
Cancel

Figure 4.22: H Automation Settings with two Busbars.

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In this screen the following operations can be carried out:

- Bring into operation or out of operation the medium voltage automation device. The default value is *into operation*.
- Edit the high voltage automation stability time (in seconds). The valid range of values is 0-300, and the default value is *60 seconds* in 0.1 second steps.
- Edit the high voltage automation (AT) switching time (in seconds). The valid range of values is 0-10, and the default value is *5 seconds* in 0.1 second steps.
- The high voltage automation levelling time is fixed and therefore appears softened and has a value of *1 second*.
- Edit the medium voltage (MT) automation switching time. The valid range of values is 0-10, and the default value is *5 seconds* in 0.1 second steps.
- Edit the presence / absence of voltage settings. Editable parameters are:
    - Voltage level for presence (in % Vrated). The valid range of values is 50-100, and the default value is *80%* in 0.1% steps.
    - Voltage level for absence (in % Vrated). The valid range of values is 0-70, and the default value is *50%* in 0.1% steps.
    - Time of presence of voltage (in seconds). The valid range of values is 0.5-5, and the default value is *1 second* in 0.1 second steps.
    - Time of absence of voltage (in seconds). The valid range of values is 0.5-5, and the default value is *1 second* in 0.1 second steps.

After editing the necessary H/Y automation settings, click **Send** to send the data to the central unit, a confirmation dialogue box being displayed prior to sending. Click **Restore** for the Central Unit to retrieve the H/Y automation settings. Click **Cancel** to come back to the main menu.

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4.10 UCSConf

The purpose of the configuration server (hereafter UCSConf) is keeping an updated central database with all configuration file revisions at substation level (SCD file) and at IED level (CID files).

The configuration server UCSConf has a web interface consisting of a number of pages that reflect the state of the UCSConf module itself and the configurations of all substation IEDs. Access can be gained from the web interface to a main page and a number of specific IED pages that are automatically generated by the UCSConf itself from data included into the substation SCD file (or from data contained in the CID files of substation IEDs).

4.10.1 Main Page

Clicking the UCSConf module button of the General System State screen, main menu and button box to the bottom right of the Web HMI, displays the Main Page. This page allows a quick look to the configuration state of all substation IEDs.

The UCSConf main page features a dynamic table with a row for each IED, in which IED data of currently active SCD files in the system are displayed at any time:

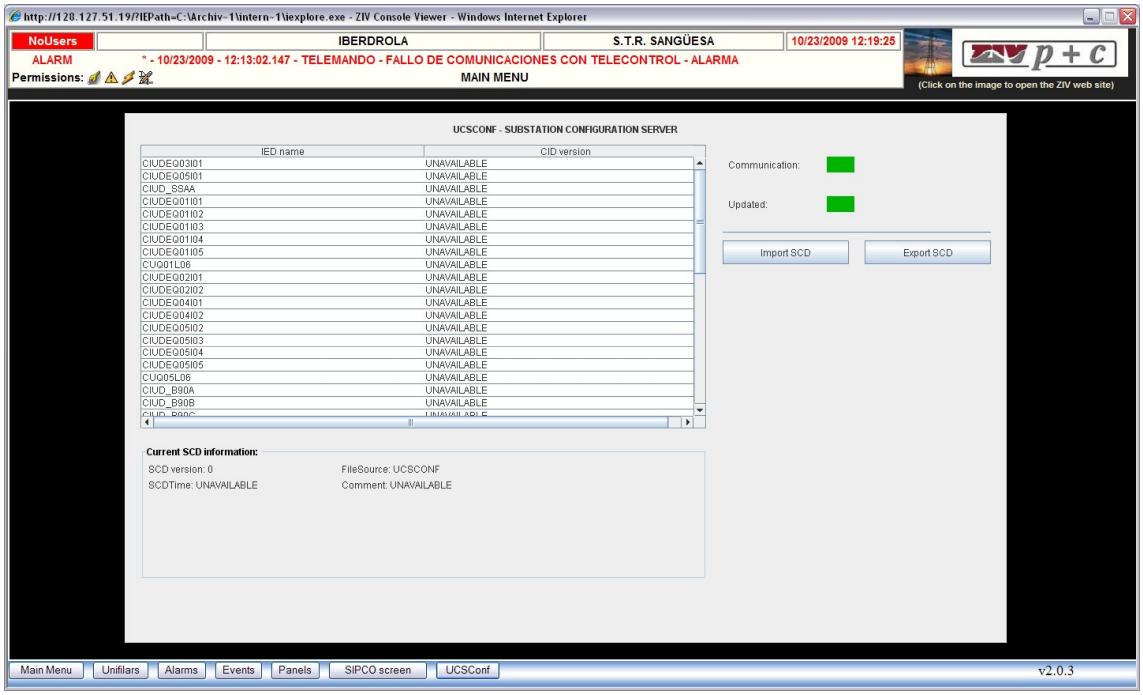

Figure 4.23: UCSConf Main Window.

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Below are described the different fields and data shown in the screen.

- **IED name.** This column shows the name of the different substation IEDs monitored by the UCSConf.
- **CID Version.** This column shows the configuration version number assigned by the UCSConf (within the CID file version database) for the configuration of each IED in the active SCD file, which may have been created by the UCSConf itself from separate IED files or directly imported as SCD file. When the information is not available it will show NOT AVAILABLE.
- **Current SCD information.** This section shows data on the active SCD.
  - **SCD Version:** SCD file version within the UCSConf database.
  - **Filesource:** shows the way the SCD file has been created and its origin. Possible values are:
    - **USER:** the SCD file has been imported into the UCSConf database by the user.
    - **UCSCONF:** the SCD file has been created by the UCSConf itself from separate CID files of each IED.
  - **SCDTime:** SCD file, date created or imported.
  - **Comment:** remarks added when the SCD file was created or imported.
- **Communication.** Shows information on the general state of communications between the SCU and IEDs. If communications between any IED and the SCU is lost, it will be shown in red. If on the contrary communications between the SCU and all IEDs is established it will be shown in green.
- **Updated:** Shows whether the UCSConf database is updated with active configuration or parameterisation in each IED. In case of disagreement with any IED it will be shown in red, otherwise it will be shown in green.
- **State:** Is the bottom left part of the screen, which will show if the UCSConf web interface is linked to UCSConf database manager or if it is waiting for the response on the part of the UCSConf of any operation initiated from the web interface.

Figure 4.24: UCSConf States.

This page features two buttons:

- **Export**: allows extracting the currently active SCD file from the UCSConf database. The file will be in advance if necessary.
- **Import**: allows importing a new active SCD file, into the UCSConf database, creating the CID files corresponding to each IED in the SCD file.

Import export operations of the substation active SCD file can be carried out connecting an USB disk to the *WorkStation* that incorporates the UCSConf database manager module or through transfer from a FTP client to the FTP server *of the WorkStation*.

Clicking an IED row displays the specific IED configuration maintenance page.

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4.10.2 Specific IED Page

These specific IED pages allow handling specific IED configurations. This page shows a table chronologically arranged with saved IED configuration databases, including the current active IED configuration.

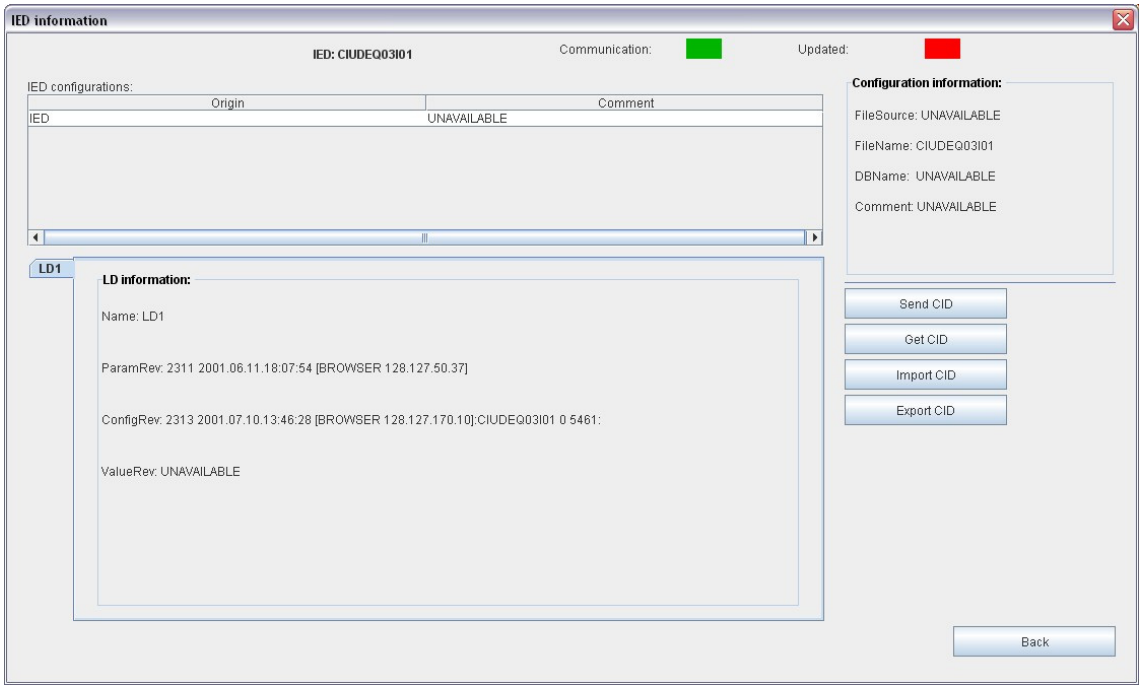

Figure 4.25: IED Screen.

Data shown in this screen are described below.

- **IED.** Name of the IED displayed.
- **Communication.** Shows whether communications between the IED and the SCU is established, it shows green when communications with the IED is established and red when it is not.
- **Updated.** Shows whether the last IED configuration saved into the UCSConf database corresponds to the current active IED configuration. It shows green when the UCSConf database is updated with the IED configuration and red otherwise.
- **Configuration Information.** Shows data of the IED configuration in the currently selected CID version in table *IED Configurations*.

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- **FileSource.** Shows the way the CID file has been created and its origin. Possible values are:
  - **USER:** the CID file has been imported from the UCSConf database by the user.
  - **SCD:** the CID file has been created by the UCSConf itself from the substation SCD file.
  - **IED:** the CID file has been retrieved by the UCSConf directly from the IED via FTP.
  - **NO DISPONIBLE:** when no CID file is available for the IED within the UCSConf database.
- **FileName.** Name of all IED's CID files saved into the UCSConf database.
- **DBName.** Name with which the selected IED's CID file version has been saved into the UCSConf database (subestation_IEDName_version).
- **Comment.** Remarks added when IED configuration is entered into the UCSConf database.
- **IED Configurations.** Shows the different configurations saved into the database for said IED.
- **Origin.** Name of the file containing said configuration. It can show "IED" in case there is no evidence of the currently active IED configuration, but not saved yet into the UCSConf database.
- **Comment.** Remarks added when said configuration is entered into the database.
- Tabs at the bottom of the screen (one for each IED's Logical Device or LD) allow displaying data contained in each IED's LDs. Displayed data consists of values of ConfigRev, ParamRev and ValueRev parameters of the selected configuration, as well as the LD name.
- **Status:** The same as for the main screen, it shows whether any operation started by the user from the web interface is in progress within the UCSConf.

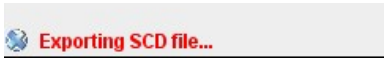

Figure 4.26: Export SCD.

The specific IED screen features four buttons:

- **Import:** To import a CID file modified outside the UCSConf module into an IED configuration database. The importing operation can be carried out from the location defined by the user (any storage drive of the *WorkStation* where the UCSConf database manager, USB disk, etc. is installed) or through transfer from an FTP client to FTP server of the *WorkStation*. UCSconf will validate the CID file to be imported informing the user of disagreements detected.
- **Export:** To export a CID file from the UCSConf database to the location defined by the user (any storage drive of the *WorkStation* where the UCSConf database manager, USB disk, etc. is installed) or through transfer from the *WorkStation* FTP server to an FTP client.
- **Get:** To retrieve via FTP protocol the IED's CID file to be included into the IED configurations database within the UCSConf.
- **Send:** To send the CID file corresponding to the selected configuration to the IED. Once the transfer of the CID file to the IED is completed it will be validated and then activated through MMS services available in the SCU for the operation of the IED *SCL-Control-Block*.

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4.10.3 Screens Displayed by Pressing the Buttons

Below are described the screens displayed by pressing the command buttons in the different pages of the UCSconf web interface.

4.10.3.a Import SCD

The function of this button is importing a SCD (containing data of all substation IEDs) into the UCSConf database, via USB or FTP, extracting the CID files corresponding to the different IEDs there contained and store new data revisions, both of IED's CID files and substation SCD file into the UCSConf database.

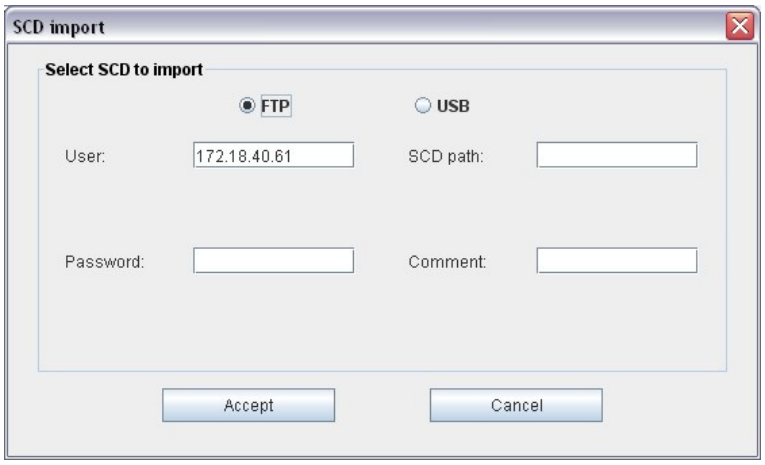

Figure 4.27: Import SCD.

Screen fields are:

- **FTP / USB.** To select SCD file import mode.
- **User.** This field is only used for the FTP mode. The FTP user is entered into this field.
- **Password.** This field is only used for the FTP mode. The FTP password is entered into this field.
- **SCD Path.** Complete pathname of the SCD file to be imported. If the import operation is carried out via USB, it will be a pathname on the local *WorkStation* PC where the UCSConf database manager resides. If the import operation is carried out via FTP it will be a pathname on the local PC where the web client has been launched.
- **Comment.** Remarks added to the UCSConf database with reference to the imported SCD file, which is furthermore propagated as remark for the revision of the CID files extracted from the same.

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4.10.3.b Export SCD

Creates the substation SCD file from active IED's configurations (CID files) in the UCSConf database.

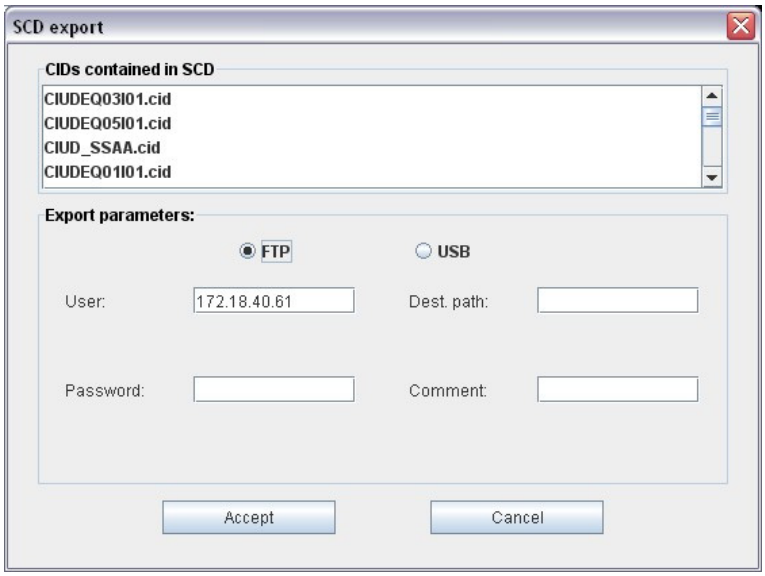

Figure 4.28: Export SCD.

Screen fields are:

- **FTP / USB.** To select file export mode.
- **User.** This field is only used for the FTP mode. The FTP user is entered into this field.
- **Password.** This field is only used for the FTP mode. The FTP password is entered into this field.
- **Dest. path.** Complete user selected pathname to locate the exported SCD. If the export operation is carried out via USB, it will be a pathname on the local *WorkStation* PC where the UCSConf database manager resides. If the export operation is carried out via FTP it will be a pathname on the local PC where the web client has been launched.
- **Comment.** Remarks added to the database with respect to the exported / created SCD file.
- **CIDs contained in SCD.** This box displays all elements that may constitute the SCD. The database will keep the reference of all of them with respect to the SCD, but only the IEDs with a CID configuration file in the UCSConf database constitute the SCD file.

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4.10.3.c Send CID

Sends a given configuration (CID file version) from the UCSConf database to an IED via FTP protocol, validates the IED's CID file and then activates said file as IED's active configuration by means of MMS services available for the IED's *SCL-Control-Block*.

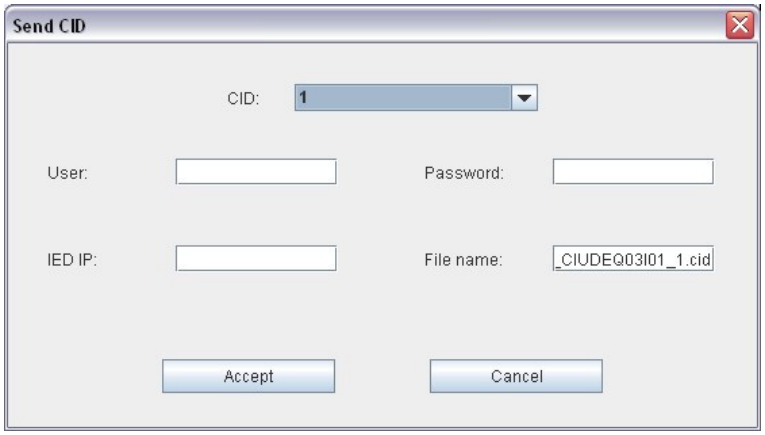

Figure 4.29: Send CID.

Screen fields are:

- **CID.** Version of the CID file to be sent to the IED.
- **User.** FTP user.
- **IED IP.** IED's IP address to which the configuration is to be sent.
- **Password.** FTP user password.
- **File Name.** Name of the configuration to be sent to the FTP.

4.10.3.d Get CID

Retrieves the IED's active configuration and saves it into the UCSConf database.

Figure 4.30: Get CID.

Screen fields are:

- **IED IP.** IP address of the IED from which the configuration is to be retrieved.
- **User.** FTP user.
- **Password.** FTP user password.
- **CID Path.** Path and name of the IED's CID file to be retrieved.
- **Comment.** Remarks to be added to the UCSConf database with respect to the retrieved configuration

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4.10.3.e Import CID

To import into the UCSConf database a new CID file entered by the user for a given IED and validate the same informing the user of errors detected in the process.

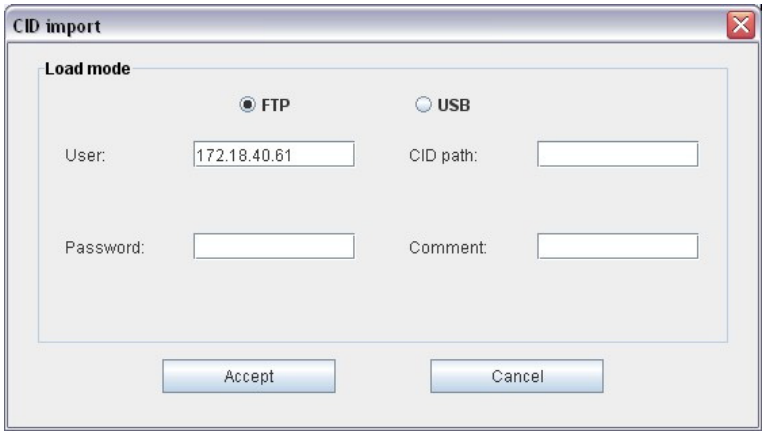

Figure 4.31: Import CID.

Screen fields are:

- **FTP / USB.** To select CID file import mode.
- **User.** This field is only used for the FTP mode. The FTP user is entered into this field.
- **Password.** This field is only used for the FTP mode. The FTP password is entered into this field.
- **CID path.** Complete pathname for the location of the CID file to import. If the import operation is carried out via USB, it will be a pathname on the local *WorkStation* PC where the UCSConf database manager resides. If the import operation is carried out via FTP it will be a pathname on the local PC where the WEB client has been launched.
- **Comment.** Remarks added to the UCSConf database with respect to the version of the imported CID file.

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4.10.3.f Export CID

Gets a revision of a specific IED's CID file from the UCSConf database and stores it in the specified pathname.

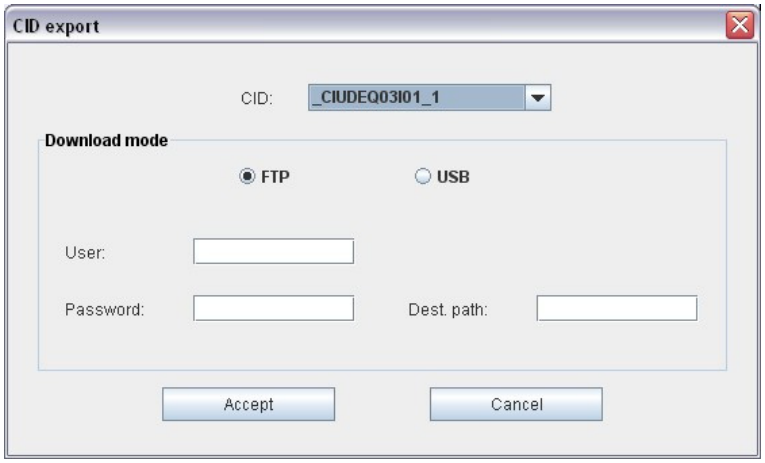

Figure 4.32: Export CID.

Screen fields are:

- **FTP / USB.** To select file export mode.
- **User.** This field is only used for the FTP mode. The FTP user is entered into this field.
- **Password.** This field is only used for the FTP mode. The FTP password is entered into this field.
- **Dest. path.** Complete user selected path to locate the exported CID file. If the export operation is carried out via USB, it will be a path on the local *WorkStation* PC where the UCSConf database manager resides. If the operation is carried out via FTP it will be a path on the local PC where the WEB client has been launched.

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5. Settings Range

Chapter 5. Settings Range

The HMI will be configured for a specific installation through the ***Zivergraph***® software. As this is a complex operation, parameters and settings ranges will not be given here, but they will be defined in the software manual or in configuration file description Appendices.

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A. HMI Configuration Files

A.1 General Description of Configuration Files A-2
A.1.1 Location of the Configuration Files A-3
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A.1 General Description of Configuration Files

This Annex describes the files to configure the two types of HMI applications for the operations available for the different types of ZIV substation Central Unit models. The two types of ZIV operations HMI are:

- HMI application for WorkStation available for models CPD, CPP and CPX: PCD models.
- Embedded WEB HMI for models CPT: CWE models.

The files to configure the HMI for ZIV operations conform to a number of general rules common to all. However, in the Embedded WEB HMI there are two files that deviate from this rule. Files **ConsoleBaseConfig.xml** and **SIPCOVisualConf.cfg**. These files have their own structure and will be described in their respective sections (**A.22** and **A.21)**.

Common details for all the configuration files are explained below:

- Lines preceded by the symbol # will not be read. This symbol can be introduced to add file headers, comments, etc.

- There may not be lines with more than 80 characters. This is why tabulations should not be introduced, as each tabulation space depends on the editor used. It may be the case that a line with tabulations written in a text editor occupies less than 80 characters, but when editing the file in another editor, more spaces are occupied by the tabulator and when the file is modified and saved, the line exceeds the maximum number allowed, resulting in a file read error, the program being aborted.

- In a line, data fields are separated by commas, so this is a forbidden character within a test field. Namely, commas may not be introduced within signal descriptions, as this text is read until a comma is encountered.

- In order to add explanatory comments within lines with data, the characters // and the desired text shall be entered after the comma of the last filed.

- Capital letters of signals defining events or alarms should not have accents, as some printers do not have character tables of accented capital letters, and events will not be printed correctly.

- All colours displayed in the different HMI screens will be determined in the corresponding files in RGB format as follows:

RR GG BB(*)	=>	RED →	FF0000	→	16711680	
		GREEN →	00FF00	→	65280	
		BLUE →	0000FF	→	255	

(*) Colour 16777216 denotes *transparency*.

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A summary of the above is shown in the sample below.

```
# Sample of configuration file
16777205,16711680, // Text and alarm background TYPE 1
10.000, //Counter request time
UNTENSIONED SPRING ALARM,
```

The first line is a comment on the file and is not taken into account. The second line are two colours that set up the format of the unacknowledged active alarms. Please note that a comma is placed after each data. The third line is the same but with a single data. The fourth line describes a signal and the comma is placed at the end and the line has less than 80 characters.

When explaining the format of the configuration files, the procedure below will be followed:

- First, a general description of the file will be made.
- Then, the different file parameters will be explained. The number of the line of the sample file in which the parameters appear will be indicated between brackets and a sample of the same will be included.
- Finally, the sample file will be included.

A.1.1 Location of the Configuration Files

- **HMI Model PCD**

Configuration files will be housed in different directories as a function of the type of HMI:

- **HMI Connected to the CPX via Network**

In this case, configuration files will be housed in directory ***\bin\,*** *within the directory in which the HMI is installed* (typically ***"c:\consola\bin\"***).

An exception is file *"subest.cfg"* (see A.13 in Annex A of CPX manual) which will be housed directly in the directory where the HMI is installed (typically *"c:\consola\"*).

Graphics files (*"*.bmp"*) will be housed in directory ***\bmp\,*** within the directory where the HMI is installed (typically ***"c:\consola\bmp\"***).

- **HMI Connected to the CPX via Modem**

In this case, configuration files will be housed in directory ***\bin\NombreSubestacion\,*** within the directory where the HMI is installed (typically ***"c:\consola\bin\NombreSubestacion\"***).

An exception is files *"subest.cfg"* and *"**NombreSubestacion**.sub"* (see A.14 in Annex A of CPX manual), which will be housed directly in the directory where the HMI is installed (typically *"c:\consola\"*).

The name of the subdirectory (***NombreSubestacion***), will be defined by the HMI configuration file *"**NombreSubestacion**.sub"*.

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This is so since the same HMI could be connected to several substations (one at a time), via modem, thus it needs to house the configuration files of all substations to which it can be connected (in separate directories).

For example, a HMI to be connected to SUBSTATION 1 and SUBSTATION 2, will have two configuration files (e.g. *"Subestacion1.sub"* and *"Subestacion2.sub"*) and the configuration files of SUBSTATION 1 will be housed in *"c:\consola\bin\Subestacion1\"* and those of SUBSTATION 2 in *"c:\consola\bin\Subestacion2\"*.

Graphics files (*"*.bmp"*) will be housed in directory ***\bmp\,*** within the directory where the HMI is installed (typically ***"c:\consola\bmp\"***).

- **HMI Model CWE**

The embedded WEB HMI has two distinct operating areas: the web server with its associated applications, and the HMI application itself. Each of these sections has its own installation directory within the central unit (Central Unit).

- **Web server applications:** They are installed in directory **"\CfDisk\www"**.
- **HMI application:** It is installed in directory **"\CfDisk\webcon"**.

The web server area is totally managed by the HMI application, which is responsible for updating its files each time a configuration is changed.

All embedded WEB HMI configuration files are located in directory **\bin\,** within the installation directory of the HMI application (**"\CfDisk\webcon\bin\"**). Graphics files (***.svg**, ***.gif**) are housed in directory **\Images\,** within the directory where the HMI is installed (**\CfDisk\Webcon\Images**).

- **Rewriting Files (HMI Model CWE)**

Any change in a HMI configuration file will result in updating the affected files. So, if a user introduces a change in the file **Unifilar.cfg** that defines the system single line diagrams, the HMI will rewrite the file **Unifilar.svg** representing graphically these single line diagrams. In order for the changes to take effect the user must reboot the HMI (rebooting the central unit is not required).

Sometimes the user may want to force this writing. In these cases, just edit any configuration file (for example, adding a space, erasing it again and saving the file) and reboot the HMI. If in doubt on which file must be edited, a good criterion is to select the file **equipos.cfg**, as it affects practically all substation issues, whereby this regenerates almost completely.

In most cases, this action will be the response to the desire of updating some substation graphics. Another option is therefore erasing the files to be rewritten, namely:

- **\CfDisk\www\wwwpub\ConsoleViewer02\Resources\Images\Unifilar\Unifilar.svg**
- **\CfDisk\www\wwwpub\ConsoleViewer02\Resources\Images\Unifilar\Paneles.svg**
- **\CfDisk\www\wwwpub\ConsoleViewer02\Resources\Images\Unifilar\SIPCO.svg**

which are the graphic files of single line diagram, panels and SIPCO screens respectively.

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A.2 Equipment Files: EQUIPOS.CFG

The file **equipos.cfg** contains the equipment number and the description of the signals as displayed in the HMI alarm and event pages.

In a substation, there are two types of equipment, bay equipment called *physical equipment*, and equipment emulated within the **UCS** (such as logic, automation, etc.) called *logic equipment*. The sum of both is the total number of equipment in the substation. This parameter is contained in the file.

The parameter format is as follows:

- **General Data of the Substation:** ***[lines 2-5]***

NombSub	,
NumTotEq	,
NumEqFis	,
NumAutom	,

- *NombSub*: Substation name.
- *NumTotEq*: Total number of equipment (physical + logic).
- *NumEqFis*: Number of physical equipment.
- *NumAutom*: Number of control function.

E.g.:
```
TEST SYSTEM,
26,
20,
3,
```

The data below are given for each substation equipment (total equipment):

- **General Equipment Data:** ***[lines 8-11]***

DirEq	,														
NombEq	,														
UbiEq	,														
N_ISC	,	N_ISE	,	N_ISS	,	N_MEA	,	N_CON	,	N_ISC8	,	MaxISC	,		

- *DirEq*: Communications address (PROCOME address).
- *NombEq*: Equipment name (maximum number of characters: 9).
- *UbiEq*: Equipment location in the substation (maximum number of characters: 9).
- *N_ISC*: Number of digital signals (ISC).
- *N_ISE*: Number of controls (ISE).
- *N_ISS*: Number of write outputs (ISS).
- *N_MEA*: Number of Measurements (MEA).
- *N_CON*: Number of counters (CON).
- *N_ISC8*: First number multiple of 8 immediately above the number of ISCs. Each ISC occupies 1 bit and this number is used to calculate internally the number of bytes occupied by all the ISCs.

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E.g.:

	7	6	5	4	3	2	1	0 (byte)
3 ISCs:						X	X	X

The multiple of 8 immediately above 3 is 8. Thus, *N_ISC8 = 8*, namely, 8 bits (1 byte) are required to store the three ISCs.

- *MaxISC*: Higher number of a PROCOME tag of an equipment signal. In the example above, it would be 2 (Number of ISCs - 1).

.

E.g.:
```
1,
6MCD*A49,
66 kV HV SYS,
308,34,3,2,1,312,307,
```

- **Configuration Data for Digital Signals (ISC): *[lines 13-25]***

EtiqISC	,	DescrISC	,
Active	,	Desiccative	,
Alarma	,		
Describe	,		

(*)

(*) It repeats for each digital signal (ISC). There will be as many as indicated by *N_ISC*.

- *EtiqISC*: PROCOME tag of signal.
- *DescrISC*: Signal description (maximum number of characters: 40).
- *Active*: Tag for the activated status of the signal (maximum number of characters: 14).
- *Desiccative*: Tag for the deactivated status of the signal (maximum number of characters: 14).
- *RESERVEdo*: Parameter reserved for HMI internal use (do not modify).
- *Describe*: Description of the element that generates the signal (maximum number of characters: 20).

E.g.
```
0, VOLTAGE PRESENCE AT BUSBARS 1,
PRESENCE,ABSENCE,
0,
66 HV SYSTEM,
1, VOLTAGE PRESENCE AT BUSBARS 2,
PRESENCE,ABSENCE,
0,
66 HV SYSTEM,
…
307,RESERVE 307,
ALARM,NORMAL,
0,
66 HV SYSTEM,
```


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- **Configuration Data of Equipment Controls (ISE): *[lines 27-48]***

EtiqISE	,	DescrISE	,								
TitVenMan	,										
NumBlqs	,										(**)
DirEqBlq	,	EtiqISCBlq	,	NegBlq	,	DescrBlq	,		(*)		

(*) It repeats for each control blocking signal. There will be as many as indicated by *NumBlqs*.
(**)It repeats for each equipment control (ISE). There will be as many as indicated by *N_ISE*.

- *EtiqISE*: PROCOME tag of the control.
- *DescrISE*: Description of the control (maximum number of characters: 40).
- *TitVenMan*: Title of the blocking window (maximum number of characters: 40).
- *NumBlqs*: Number of control blockings.
- *DirEqBlq*: Address of the equipment to which the control blocking signal belongs.
- *EtiqISCBlq*: PROCOME tag of the control blocking signal.
- *NegBlq*: Negation bit of blocking signal.
- *DescrBlq*: Blocking description (maximum number of characters: 40).

```
E.g.  0,SWITCH TO LOCAL COMMAND,// Control 1
      ,
      0,          // Num. Blockings
      …
      24,CLOSE COMMAND 52-E FROM PANEL,// Control 25
      THERE EXISTS A BLOCKING,
      11,         // Num. Blockings
      256,2,0,OPERATION BLOCKING BY “H” CONTROL FUNCTION,
      1,2,0,OPERATION BLOCKED BY RELAY TRIP 86T-1,
      1,3,0,OPERATION BLOCKING BY RELAY 86T-2 TRIP,
      1,246,0,BREAKER 52-E CLOSED,
      1,247,0,BREAKER 52-E UNKNOWN,
      1,248,0,BREAKER 52-E LOCKED OUT TAGGED OUT,
      1,285,0,TEMPORARY BLOCKING 52-E CLOSE ACTIVATED,
      1,298,0,BREAKER 52-E ALARM UNTENSIONED SPRINGS,
      1,287,0,OPEN COMMAND 52-E BY 69L,
      1,300,0,LOW GAS PRESSURE LEVEL 2 ALARM 2,
      1,301,0, CP SELECTOR 52-E TO LOCAL,
      …
      33,RESERVE 33,// CONTROL 34
      ,
      0,          // Num. Blockings
```


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- **Write-Output Configuration Data (ISS): *[lines 50-52]***

Configuration data

EtiqISS	,	DescrISS	,	] (*)

(*) It repeats for each write-output (ISS). There will be as many as indicated by *N_ISS*.

- *EtiqISS*: PROCOME tag of write-output.
- *DescrISS*: Description of the write-output (maximum number of characters: 40).

E.g.:
```
0,TRIP 86 T-1,
1,TRIP 86 T-2,
2,'H' TO AUTOMATIC,
```

- **MEASUREMENT Configuration Data (MEA): *[lines 54-57]***

EtiqMEA	,	DescrMEA	,					] (*)
Pend	,	Origen	,	LimInfOR	,	LimSupOR	,	

(*) It repeats for each MEASUREMENT (MEA). There will be as many as indicated by *N_MEA*.

- *EtiqMEA*: PROCOME tag of the MEASUREMENT.
- *DescrMEA*: Description of the MEASUREMENT (maximum number of characters: 40).
- *Pend*: Slope of MEASUREMENT conversion line.
- *Origen*: Origin of the MEASUREMENT conversion line.
- *LimInfOR*: Lower limit below which the MEASUREMENT is deemed out of range. This value is configured in engineering values, namely, already scaled up by the "*Pend*" and "*Origen*" factors.
- *LimSupOR*: Upper limit above which the MEASUREMENT is deemed out of range. This value is configured in engineering values, namely, already scaled up by the "*Pend*" and "*Origen*" factors.

LimInfOR and *LimSupOR* are optional. If these are not implemented, the WEB HMI will not use the MEASUREMENT out of range criterion. On the other hand, if one is displayed, the two must be included.

E.g.:
```
0, VOLTAGE MEASUREMENT IN LINE 1,
0.0232088,0,-94.3,94.3,
1, VOLTAGE MEASUREMENT IN LINE 2,
0.0232088,0,0,94.3,
```


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- **Counter Configuration Data (CON): *[lines 59-60]***

EtiqCON	,	DescrCON	,	] (*)
Pend	,	Origen	,	

(*) It repeats for each counter (CON). There will be as many as indicated by *N_CON*:

- *EtiqCON*: Counter PROCOME tag.
- *DescrCON*: Counter description (maximum number of characters: 40).
- *Pend*: Slope of the counter conversion line.
- *Origen*: Origin of the counter conversion line.

E.g.: **0,BUSBAR ACTIVE ENERGY INPUT,**
0.0036,0,

The file becomes:

```
[1]   # SUBSTATION
[2]   TEST SYSTEM, // Substation name
[3]   26, // Total number of equipment
[4]   20, // Number of physical equipment
[5]   3, // Number of control functions
[6]   #
[7]   # Equipment                    EQUIPMENT 1 (66KV breakers)
[8]   1, // PROCOME address
[9]   6MCD*A49, // Equipment name
[10]  66kV HV SYS, // Equipment location
[11]  308,34,3,2,1,312,307, // Number of ISC,ISE,ISS,MEA,CON
[12]  # ISC                          ISC signals
[13]  0, VOLTAGE PRESENCE AT BUSBARS 1, // Associated signal and text
[14]  PRESENCE,ABSENCE, // Activation and deactivation
[15]  0, // Alarm?
[16]  66 HV SYSTEM, // Element description
[17]  1,VOLTAGE PRESENCE AT BUSBARS 2,
[18]  PRESENCE,ABSENCE,
[19]  0,
[20]  66 HV SYSTEM,
[21]  …
[22]  307, RESERVE 307,
[23]  ALARM,NORMAL,
[24]  0,
[25]  66 HV SYSTEM,
[26]  # ISE                          ISE signals
[27]  0, COMMAND TO SWITCH TO NORMAL ,
[28]  ,
[29]  0,
[30]  …
[31]  24, CLOSE COMMAND 52-E FROM PANEL,// Signal and text
[32]  THERE IS A BLOCKAGE, // Command window title
[33]  11, // Number of blockings
[34]  256,2,0, BLOCKING OF OPERATION BY "H" CONTROL FUNCTION IN AUTOM., //
      Eq,signal and description block
[35]  1,2,0, OPERATION BLOCKING BY TRIPPING OF RELAY 86T-1,
[36]  1,3,0, OPERATION BLOCKING BY TRIPPING OF RELAY 86T-2,
```


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```
[37]  1,246,0, BREAKER 52-E CLOSED,
[38]  1,247,0,BREAKER 52-E UNKNOWN,
[39]  1,248,0,BREAKER 52-E LOCKED OUT TAGGED OUT,
[40]  1,285,0,TEMPORARY BLOCKING OF BREAKER 52-E CLOSE OPERATION ACTIVATED,
[41]  1,298,0,BREAKER 52-E UNTENSIONED SPRING ALARM,
[42]  1,287,0, OPEN COMMAND 52-E BY 69L,
[43]  1,300,0,LOW GAS PRESSURE ALARM LEVEL 2,
[44]  1,301,0,SELECTOR CP 52-E TO LOCAL,
[45]  …
[46]  33,RESERVE 33,
[47]  ,
[48]  0,
[49]  # ISS                        ISS signals
[50]  0,TRIP 86 T-1, // Associated signal and text
[51]  1,TRIP 86 T-2,2,'H' IN AUTOMATIC,
[52]  # MEA                        MEA signals
[53]  0,MEDIDA DE TENSION EN LINE 1, // Associated signal and text
[54]  0.0232088,0,-94.3,94.3, // Conversion factor
[55]  1,0 VOLTAGE MEASUREMENT LINE 2,
[56]  0.0232088,0,0,94.3,
[57]  # CON                        CON signals
[58]  0, BUSBAR ACTIVE ENERGY INPUT  ,// Associated signal and text
[59]  0.0036,0,// Conversion factor
[60]  # Equipment                   EQUIPMENT 2 (OWN POINTS)
[61]  …
```


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A.3 Signal Panel File: PANELES.CFG

File **"paneles.cfg"** contains the number of signal panels and their configuration. For each button displayed in the HMI screen for the substation signal summary (general signal panel) there is another screen of LEDs distributed in three windows (STATUSES, PROTECTIONS and ALARMS) that inform on the status of certain signals associated to the button. All this information is saved into the file *"paneles.cfg"*. File format is as follows:

- **General Substation Signal Panel Data: *[lines 2-6]***

NombPan	,
NombEST	,
NombPRO	,
NombALA	,
NumBotones	,

- *NombPan*: Name of the panel page (maximum number of characters: 40).
- *NombEST*: Title of the STATUS window (maximum number of characters: 20).
- *NombPRO*: Title of the PROTECTION window (maximum number of characters: 20).
- *NombALA*: Title of the ALARM window (maximum number of characters: 20).
- *NumBotones*: Number of buttons of the summary panel (general panel). The maximum allowable value is 45 buttons in HMI model PCD.

```
E.g.: SIGNAL PANELS,
       STATUSES ,
       PROTECTIONS ,
       ALARMS ,
      20,
```

Below all buttons are configured (one after the other). For each button defined the following data are given:

- **General Data for each Button of the General Signal Panel: [lines 9-11]**

NombBoton	,				
ColorEST	,	ColorPRO	,	ColorALA	,
NumEST	,	NumPRO	,	NumALA	,

- *NombBoton*: Number of button (maximum number of characters: 15).
- *ColorEST*: Colour of the status window frame.
- *ColorPRO*: Colour of the protection window frame.
- *ColorALA*: Colour of the alarm window frame.
- *NumEST*: Number of signals displayed on the status window.
- *NumPRO*: Number of signals displayed on the protection window.
- *NumALA*: Number of signals displayed on the alarm window.

```
E.g.: T-A,
      65280,65535,16711680,
      18,6,12,
```


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- **Configuration Data of STATUS Window Signals: [lines 14-25]**

Alarma	,	Neg	,	(*)
DirEq	,			
EtiqISC	,	DescrISC	,	

(*) It repeats for each status window signal. There will be as many as indicated by *NumEST.*

- *Alarma*: Alarm bit (indicates whether the signal has been considered as alarm, so that the attached led can blink, or if on the contrary, it has not been considered as alarm and cannot blink).
- *Neg*: Negation bit (indicates if the attached led activates when the ISC signal status is 1 or when the ISC status is 0).
- *DirEq*: Address of the equipment to which the signal belongs.
- *EtiqISC*: Signal PROCOME tag.
- *DescrISC*: Signal description (maximum number of characters: 20).

E.g.:
```
# STATUS 1
0,0,
7,
8, LOCAL STATUS,
# STATUS 2
0,1,
7,
8, REMOTE CONTROL STATUS,
…
# STATUS 18
0,0,
7,
87,69L ACTIVATED,
```

- **Configuration Data of PROTECTION Panel Signals: *[lines 27-38]***

Alarma	,	Neg	,	(*)
DirEq	,			
EtiqISC	,	DescrISC	,	

(*) It repeats for each protection panel signal. There will be as many as indicated by *NumPRO.*

- *Alarma*: Alarm bit (indicates whether the signal has been considered as alarm, so that the attached led can blink, or if on the contrary, it has not been considered as alarm and cannot blink).
- *Neg*: Negation bit (indicates if the attached led activates when the ISC signal status is 1 or when the ISC status is 0).
- *DirEq*: Address of the equipment to which the signal belongs.
- *EtiqISC*: Signal PROCOME tag.
- *DescrISC*: Signal description (maximum number of characters: 20).

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```
E.g.: # PROTECTION 1
      1,0,
      7,
      21,FINAL TRIP,
      # PROTECTION 2
      1,0,
      7,
      22, INST. PHASE TRIP,
      …
      # PROTECTION 6
      1,0,
      7,
      26, GENERAL PROT TRIP,
```

- **Configuration Data of ALARM Panel Signals: *[lines 41-52]***

Alarma	,	Neg	,
DirEq	,		
EtiqISC	,	DescrISC	,

(*)

(*) It repeats for each alarm panel signal. There will be as many as indicated by *NumALA*.

- *Alarma*: Alarm bit (indicates whether the signal has been considered as alarm, so that the attached led can blink, or if on the contrary, it has not been considered as alarm and cannot blink).
- *Neg*: Negation bit (indicates if the attached led activates when the ISC signal status is 1 or when the ISC status is 0).
- *DirEq*: Address of the equipment to which the signal belongs.
- *EtiqISC*: Signal PROCOME tag.
- *DescrISC*: Signal description (maximum number of characters: 20).

```
E.g.: # ALARM 1
      1,0,
      7,
      6,FAULT,
      # ALARM 2
      1,0,
      7,
      7,URGENT FAULT,
      …
      # ALARM 12
      1,0,
      7,
      100,LOW GAS PRESSURE 2nd LEVEL,
```

The file becomes:

```
[1]   #PANELS
[2]   SIGNAL PANELS, // Name of Panel window
[3]    STATUSES , // Name of STATUS panel
[4]    PROTECTIONS , // Name of PROTECTION panel
[5]    ALARMS , // Name of ALARM panel
```


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```
[6]   20, // Number of buttons
[7]   …
[8]   # Button                      BUTTON 4
[9]   T-A,// Button name
[10]  65280,65535,16711680,// Colour of statuses, protections and alarms
[11]  18,6,12,// Number of statuses, protections and alarms
[12]  #
[13]  # STATUS 1
[14]  0,0,// Alarm, Negation
[15]  7,// Equipment address
[16]  8,LOCAL STATUS,// Signal tag, Signal description
[17]  # STATUS 2
[18]  0,1,
[19]  7,
[20]  8,REMOTE CONTROL STATUS,
[21]  …
[22]  # STATUS 18
[23]  0,0,
[24]  7,
[25]  87,69L ACTIVATED,
[26]  # PRO 1
[27]  1,0,
[28]  7,
[29]  21,FINAL TRIP,
[30]  # PRO 2
[31]  1,0,
[32]  7,
[33]  22, INST. PHASE TRIP,
[34]  …
[35]  # PRO 6
[36]  1,0,
[37]  7,
[38]  26, GENERAL PROT TRIP,
[39]  #
[40]  # ALR 1
[41]  1,0,
[42]  7,
[43]  6,FAULT,
[44]  # ALR 2
[45]  1,0,
[46]  7,
[47]  7,URGENT FAULT,
[48]  …
[49]  # ALR 12
[50]  1,0,
[51]  7,
[52]  100,LOW GAS PRESSURE 2nd LEVEL,
[53]  ## BUTTON                      BUTTON 5
[54]  …
```


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A.4 Control Function Definition File: AUTOMA.CFG

This file contains the number and type of the substation control functions. This file contains data on the screen displayed when clicking *Control function configuration* option of the general menu, which allows editing the settings of the different control functions: H, resistive ground detection, ERAS and logic settings. This is the file ***"automa.cfg"***. File format is as follows:

- **General Data of Control Functions: *[line 2]***

NumAutom	,

  - *NumAutom*: Number of substation control functions.

E.g.: **4,**

- **Control Function Data: *[lines 4-18]***

NombAutom	,			
FuncConfig	,	FuncCheckAjs	,	(*)
DirEq	,			

(*) It repeats for each control function defined. There will be as many as indicated by *NumAutom*.

  - *NombAutom*: Button text displayed on the HMI screen, corresponding to control function configuration (maximum number of characters: 15).
  - *FuncConfig*: Control function configuration parameter. This number can take the following values:
    - Ground control function ..... Parameter 0
    - H Control function ..... Parameter 1
    - Eras Control function ..... Parameter 2
    - Logic settings ..... Parameter 3
  - *FuncCheckAjs*: Logic Settings check function. It only has sense for this control function, and otherwise it has to be configured always to zero. Within the logic, it identifies the check function to be carried out to the settings before sending them to the Central Unit. The functions defined so far are:

    - **Type 1**: Condition: {AJ1} < ({AJ2} / { AJ0}). This condition is related to the one set by SET PE Enernova (EDP), in which it was provided that the setting value T1 < (T2/N). That is why in this case the settings below must be defined **compulsorily in the following sequence** in the file "logica.cfg":

      AJ0.....N
      AJ1.....T1
      AJ2.....T2 etc...
      From here, all other settings required will be configured.
  - *DirEq*: PROCOME address of the control function (it will correspond to the one assigned to each of them: H Control function (260), Eras Control function (261), Ground Control function (259, 262…) and Logic (256).

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E.g.:
```
4,
H Control function,// Control function 1
1,0,
260,
GROUND M-1,// Control function 2
0,0,
259,
ERAS,// Control function 3
2,0,
261,
LOGIC,
3,1,
256,
```

The file becomes:

```
[1]   #CONTROL FUNCTION CONFIGURATION
[2]   4, // Number of control functions
[3]   # CONTROL FUNCTION
[4]   H CONTROL FUNCTION, // Name of Control function
[5]   1,0, // Configuration function
[6]   260, // Control function address
[7]   # CONTROL FUNCTION
[8]   GROUNDS M-1, // Name of control function
[9]   0,0, // Configuration function
[10]  259, // Control function address
[11]  # CONTROL FUNCTION
[12]  ERAS, // Name of control function
[13]  2,0,// Configuration function
[14]  261, // Control function address
[15]  # CONTROL FUNCTION
[16]  LOGIC, // Name of control function
[17]  3,1,// Configuration function
[18]  256, // Control function address
```


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A.5 Resistive Ground Control Function Data File: INFOTIER.CFG

This file, ***"infotier.cfg"***, contains necessary data to display the resistive ground control function status screen. This screen contains a maximum of three general information signals (header) and as many line information signals as medium voltage lines belonging to the control function responsible for ground detection have been defined. A led is associated to each signal, the colour of which indicates the signal status. File format is as follows:

- **General data of the resistive ground control function:** ***[lines 2-3]***

NombPantAuto	,			
NumSeñCab	,	NumSeñLin	,	

- *NombPanAuto*: Title of the resistive ground data screen (maximum number of characters: 20).
- *NumSeñCab*: Number of header signals (general data on the control function status).
- *NumSeñLin*: Number of line data signals.

E.g.:
```
CONTROL FUNCTION RESISTIVE GROUND,
2,4,
```

- **Configuration Data of HEADER Signals and their Graphic Display:** ***[lines 5-15]***

ColorLed_0	,	ColorLed_1	,	ColorLed_?	,	(*)
ColorTxtSeñ	,	ColorFonSeñ	,			
Alarma	,	Neg	,			
DirEq	,					
EtiqISC	,	DescrISC	,			

(*) It repeats for each header signal. There will be as many as indicated by *NumSeñCab*.

- *ColorLed_0*: Led colour when the signal is set to zero.
- *ColorLed_1*: Led colour when the signal is set to one.
- *ColorLed_?:* Led colour when the signal is set to error.
- *ColorTxtSeñ*: Colour of the signal label text.
- *ColorFonSeñ*: Colour of the signal label background.
- *Alarma*: Alarm bit (indicates whether the signal has been considered as alarm, so that the attached led can blink, or if on the contrary, it has not been considered as alarm and cannot blink).
- *Neg*: Negation bit (indicates if the attached led activates when ISC = 1 or when ISC = 0).
- *DirEq*: Communications address of the equipment generating this signal.
- *EtiqISC*: Signal PROCOME tag.
- *DescrISC*: Signal description (associated text) (maximum number of characters: 20).

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E.g.:
```
# HEADER 1
65280,16711680,8355711,
16777215,0,
0,0,
256,
25,BOOTED,
# HEADER 2
65280,16711680,8355711,
16777215,0,
0,0,
256,
26,STOPPED WITHOUT DETECTION,
```

- **Configuration Data of LINE Signals and their Graphic Display: *[lines 17-28]***

ColorLed_0	,	ColorLed_1	,	ColorLed_?	,
ColorTxtSeñ	,	ColorFonSeñ	,		
Alarma	,	Neg	,		
DirEq	,				
EtiqISC	,	DescrISC	,		

(*)

(*) It repeats for each line signal. There will be as many as indicated by *NumSeñLin*.

- *ColorLed_0*: Led colour when the signal is set to zero.
- *ColorLed_1*: Led colour when the signal is set to one.
- *ColorLed_?:* Led colour when the signal is set to error.
- *ColorTxtSeñ*: Colour of the signal text.
- *ColorFonSeñ*: Colour of the signal label background.
- *Alarma*: Alarm bit (indicates whether the signal has been considered as alarm, so that the attached led can blink, or if on the contrary, it has not been considered as alarm and cannot blink).
- *Neg*: Negation bit (indicates if the attached led activates when ISC = 1 or when ISC = 0).
- *DirEq*: Communications address of the equipment generating this signal.
- *EtiqISC*: Signal PROCOME tag.
- *DescrISC*: Signal description (associated text) (maximum number of characters: 20).

E.g.:
```
# LINE 1
65280,16711680,8355711,
16777215,0,
1,0,
259,
7, GROUND LINE-1 13 kV,
…
# LINE 4
65280,16711680,8355711,
16777215,0,
1,0,
262,
10,GROUND LINE-10 13 kV,
```


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The file becomes:

```
[1]   #GROUND CONTROL FUNCTION DATA
[2]   RESISTIVE GROUND CONTROL FUNCTION, // Window name
[3]   2,4, // Number of header lines and lines
[4]   # CAB
[5]   65280,16711680,8355711, // led colour (0, 1, ?)
[6]   16777215,0, // label colour (text, background)
[7]   0,0, // Alarm bit y negation bit
[8]   256, // Equipment index
[9]   25,BOOTED, // PROCOME tag and Abbreviated us. tag
[10]  # CAB
[11]  65280,16711680,8355711, // led colour (0, 1, ?)
[12]  16777215,0, // label colour (text, background)
[13]  0,0, // Alarm bit and negation bit
[14]  256, // Equipment index
[15]  26, STOPPED WITHOUT DETECTION , // PROCOME tag and Abbreviated us. tag
[16]  # LIN
[17]  65280,16711680,8355711, // led colour (0, 1, ?)
[18]  16777215,0, // label colour (text, background)
[19]  1,0,// Alarm list
[20]  259, // Equipment index
[21]  7,GROUND LINE-1 13kV, // PROCOME tag y Abbreviated us. tag
[22]  …
[23]  # LIN
[24]  65280,16711680,8355711, // led colour (0, 1, ?)
[25]  16777215,0, // label colour (text, background)
[26]  1,0,// Alarm list
[27]  262, // Equipment index
[28]  10,GROUND LINE -10 13kV, // PROCOME tag y Abbreviated us. tag
```


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A.6 Configuration File of H and Y Control Function: AUTOH.CFG

This file contains some aspects of the H and Y control functions, which can vary from one facility to another. This is the file ***"autoh.cfg"***. File format is as follows:

- **Texts corresponding to the 4 possible Voltage Presence / Absence Control Functions: *[line 2-5]***

These texts will be displayed on the settings editing panel of the HMI's H control function.

TextoPRESMULA	,
TextoPRESMULB	,
TextoPRESUA	,
TextoPRESUB	,

- *TextoPRESMULA*: Text of line A voltage presence control function (maximum number of characters: 34).
- *TextoPRESMULB*: Text of line B voltage presence control function (maximum number of characters: 34).
- *TextoPRESUA*: Text of coupling A voltage presence control function (maximum number of characters: 34).
- *TextoPRESUB*: Text of coupling B voltage presence control function (maximum number of characters: 34).

For the Y control function, there is only one medium voltage busbar, so that the field of the nonexistent busbar will be kept empty (*TextPRESUA* or *TextPRESUB)*;in this line only a comma will be displayed.

E.g.:
```
C.F. Volt Pres/Abs. in line A,
C.F. Volt Pres/Abs. in line B,
C.F. Volt Pres/Abs. in coup A,
```
C.F. Voltage Pres/Abs. in coup B,

- **Nominal Voltage Text: [line 6]**

TextoTensiónNominalAlta	,	TextoTensiónNominalMedia	,

- *TextoTensiónNominalAlta*: Nominal high voltage text (maximum number of characters: 9). This text will be displayed on the settings editing panel of the high voltage presence absence control functions (% *TextoTensiónNominalAlta*).
- *TextoTensiónNominalMedia*: Nominal medium voltage text (maximum number of characters: 9). This text will be displayed on the settings editing panel of the medium voltage presence absence control functions (% de *TextoTensiónNominalMedia*).

E.g.:
```
45 kV,13.5 kV,
```


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- **Data on the Existence or not of the Different H Control Function Preferences: *[lines 7-10]***

ExistePrefManual	,
ExistePrefA	,
ExistePrefB	,
ExistePrefAB	,

  - *ExistePrefManual*: This bit indicates whether there exists (1) or not (0) manual preference. Default value is 1.
  - *ExistePrefA*: This bit indicates whether there exists (1) or not (0) A preference. Default value is.
  - *ExistePrefB*: This bit indicates whether there exists (1) or not (0) B preference. Default value is.
  - *ExistePrefAB*: This bit indicates whether there exists (1) or not (0) AB preference. Default value is.

```
E.g.: 1,  // Pref Manual
      1,  // Pref A
      1,  // Pref B
      0,  // Pref AB
```

The file becomes:

```
[1]   #CONFIGURATION OF H CONTROL FUNCTION
[2]   Voltage pres/abs C.F. in line A, //PRESMULA
[3]   Voltage pres/abs C.F. in line B, //PRESMULB
[4]   Voltage pres/abs C.F. in coup A, //PRESUA
[5]   Voltage pres/abs C.F. in coup B, //PRESUB
[6]   45 kV,13.5 kV, // Nominal High Voltage, Nominal Medium Voltage
[7]   1, // Is there MANUAL preference?
[8]   1, // Is there A preference?
[9]   1, // Is there B preference?
[10]  0, // Is there AB preference?
```


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A.7 Client File: CLIENTE.CFG

This file contains a number of features, which can be configured by the client company, adapting to its own preference. This is file ***"cliente.cfg"***. File format is as follows:

- **General Client Data:** ***[line 1]***

NombCliente	,	ModeloPCD	,

  - *NombCliente*: Name of the client company (maximum number of characters: 10).
  - *ModeloPCD*: PCD model (maximum number of characters: 18).

E.g.: **`CLIENT TESTS,1PCD-A2A-510000IA,`**

- **Alarm and Event Data from the Sorting and Graphic Display Point of View:** ***[lines 2-7]***

OrdenAla	,	OrdenSuc	,	MaxNumSuc	,		
ColorTxtAla_1	,	ColorFonAla_1	,	ColorFonAlaSel_1	,	ColorFonAlaSelBorr_1	,
ColorTxtAla_2	,	ColorFonAla_2	,	ColorFonAlaSel_2	,	ColorFonAlaSelBorr_2	,
ColorTxtAla_3	,	ColorFonAla_3	,	ColorFonAlaSel_3	,	ColorFonAlaSelBorr_3	,
ColorTxtActSuc	,	ColorFonActSuc	,				
ColorTxtDesacSuc	,	ColorFonDesacSuc	,				

  - *OrdenAla*: The alarm sorting bit indicates whether sorting or not the alarms of the HMI alarm screen.
  - *OrdenSuc*: The event sorting bit indicates whether sorting or not the events of the HMI event screen.
  - *MaxNumSuc*: Maximum number of events stored in the hard disk file. Default value is 500. The maximum value allowed by the WEB HMI is 2000.
  - *ColorTxtAla_1*: Text colour of TYPE 1 alarms (active and unacknowledged alarms).
  - *ColorFonAla_1*: Background colour of TYPE 1 alarms.
  - *ColorFonAlaSel_1*: Background colour of selected TYPE 1 alarms.
  - *ColorFonAlaSelBorr_1*: Background colour of TYPE 1 alarms selected for deletion.
  - *ColorTxtAla_2*: Text colour of TYPE 2 alarms (active and unacknowledged alarms).
  - *ColorFonAla_2*: Background colour of TYPE 2 alarms.
  - *ColorFonAlaSel_2*: Background colour of selected TYPE 2 alarms.
  - *ColorFonAlaSelBorr_2*: Background colour of TYPE 2 alarms selected for deletion.
  - *ColorTxtAla_3*: Text colour of TYPE 3 alarms (non active and unacknowledged alarms).
  - *ColorFonAla_3*: Background colour of TYPE 3 alarms.
  - *ColorFonAlaSel_3*: selected TYPE 3 alarms.
  - *ColorFonAlaSelBorr_3*: Background colour of TYPE 3 alarms selected for deletion.

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- *ColorTxtActSuc*: Text colour of activated events.
- *ColorFonActSuc*: Background colour of activated events.
- *ColorTxtDesacSuc*: Text colour of deactivated events.
- *ColorFonDesacSuc*: Background colour of deactivated events.

E.g.:
```
1,1,1000,
16777205,16711680,2583960,16711935,
16711680,16777216,16776960,8453888,
16777205,16777216,4433285,16747347,
65280,16777216,
16776960,16777216,
```

- **Time Data related to the Connection: *[lines 8-10]***

TimeReintCx	,	TimeEntreReintCx	,
TimePetCon	,		
TimeResCx	,		

- *TimeReintCx*: Retry time of the connection to the Central Unit (in seconds).
- *TimeEntreReintCx*: Time elapsed from the moment when the connection to the Central Unit is aborted until the time *TimeReintCx* for connection retry (in seconds in full format) is activated. If it is not configured, the HMI considers the default value (15 seconds).
- *TimePetCon*: Counter request time (in seconds).
- *TimeResCx*: Maximum time allowed for the HMI without receiving data from the Central Unit (in seconds). When this time times out, the HMI will wait three times (separated by an interval equal to the parameter value) for receiving a response from the Central Unit, before a communications error is generated.

E.g.:
```
5.000,5,
10.000,
5,
```

- **Data on the RESERVE Buttons of Certain HMI Screens: *[lines 11-12]***

AtrBotRes	,
TxtBotRes	,

- *AtrBotRes*: Attribute of RESERVE (not used) buttons. They can be displayed in the normal way (620 = MODE), dimmed (500 = Dimmed) or invisible (530 = Invisible). This parameter has no effect in CWE models.
- *TxtBotRes*: RESERVE button text (maximum number of characters: 16). This parameter has no effect in CWE models.

E.g.:
```
500,
Vacant,
```


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- **Data to Identify the Type of Alarm or Event: *[lines 14-21]***

These are characters displayed at the beginning of each alarm or event on the corresponding HMI screen.

IdNormal	,
IdNormalDes	,
IdRedun	,
IdRedunDes	,
IdInterno	,
IdInternoDes	,
IdSinIden	,
IdSinIdenDes	,

- *IdNormal*: Normal alarm or event. Default value is ' '.
- *IdNormalDes*: Normal asynchronous alarm or event. Default value is '∗'.
- *IdRedun*: Alarm or event generated by the redundancy tasks. Default value is 'R'.
- *IdRedunDes*: Alarm or event generated by asynchronous tasks. Default value is 'r'.
- *IdInterno*: Internal alarm or event, namely, that is not originated in any equipment. Default value is 'I'.
- *IdInternoDes*: Internal alarm or event generated by asynchronous tasks. Default value is 'i'.
- *IdSinIden*: Unidentified alarm or event. Default value is '?'.
- *IdSinIdenDes*: Unidentified alarm or event generated by asynchronous tasks. Default value is '¿'.

E.g.:
```
 ,
*,
R,
r,
I,
i,
?,
```

- ¿,

- **Alarm Sound Data: *[line 23]***

TipoSonido	,	FichSonido	,	AlrMsgPopup	,	ComandoMsgPopup	,

- *TipoSonido*: If an alarm occurs, this number indicates whether a beep (2), a sound file (1) or nothing (other) is produced.
- *FichSonido*: Sound file (*.wav) that sounds when an alarm occurs in case the field *TipoSonido* is set to 1. This file must be stored in subdirectory *SOUNDS*, within the directory of the hard disk in which the HMI application was installed.

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- *AlrMsgPopup*: Indicates whether the Popup message Send function when an alarm occurs is enabled. 0 = Disabled; 1 = Enabled. Default value is 0. It takes the default value if not configured.
- *ComandoMsgPopup*: Name of the program to be launched when an alarm occurs. The complete path, including the disk unit will be included. The parameter will not be read if the parameter AlrMsgPopup is not configured or is configured to 0. The function of the above is to be able to launch a popup message program to notify the user that an alarm has occurred.

Below is an example of this program:

File name: alarma.bat.
File contents: c:\archiv~1\bopupm~1\bopup /s w-br-dis-001,s.ruiz Alarm in substation XXX.

E.g.: **`1,ding.wav,1,c:\alarma.bat,`**

- **Data on a Number of Options, which in older Versions were included within the Software itself by means of Compilation: *[line 27]***

BDCO	,	bREM	,	bGPS	,	bCONSENNEG	,	bTEL	,	...
...		bNOSINC	,	bNOINFRM	,	bNOPROT	,	bNOCFGCNT	,	...
...		bNOSIM	,	colorDescon	,	bGestAlrSucEnUCS	,			

- *bDCO*: Indicates whether field DCO of a control function or object of a single line diagram exists in the corresponding file and has a meaning (*bDCO* = 1) or it is not in the file (*bDCO* = 0). Default value is 1. In models CWE this parameter has no effect.
- *bREM*: Indicates whether the part corresponding to the Remote PC is displayed on the SIPCO status screen (*bREM* = 1) or not (*bREM* = 0). In models CWE this parameter has no effect.
- *bGPS*: Indicates whether the part corresponding to the clock GPS is displayed on the SIPCO status screen (*bGPS* = 1) or not (*bGPS* = 0).
- *bCONSENNEG*: Indicates whether at the time of displaying page bars, bay bars, lines, signal panel leds…the negated signal bit is taken into account (*bCONSENNEG* = 1) or not (*bCONSENNEG* = 0). In case of page bars, bay bars and lines, if *bCONSENNEG is set to* 0 said signal negation fields do not appear in file “unifilar.cfg”. It must be set to 1 by default. In models CWE this parameter has no effect.
- *bTEL*: Indicates whether the part corresponding to the remote control is displayed on the SIPCO status screen (*bTEL* = 1) or not (*bTEL* = 0).
- *bNOSINC:* Indicates whether the HMI synchronises its time with the received time (bNOSINC=0) or not (bNOSINC=1). In models CWE this parameter has no effect.
- *bNOINFRM:* Indicates whether report access BUTTON is enabled (bNOINFRM=0) or disabled (bNOINFRM=1). In models CWE this parameter has no effect.
- *BNOPROT:* Indicates whether the protection access BUTTON is enabled (bNOPROT=0) or disabled (bNOPROT=1). In models CWE this parameter has no effect.
- *bNOCFGCNT:* Indicates whether the BUTTON for access to central configuration (engineering menu) is enabled (bNOCFGCNT=0) or disabled (bNOCFGCNT=1). In models CWE this parameter has no effect.

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- *bNOSIM:* Indicates whether the signal simulator access (engineering menu) BUTTON is enabled (bNOSIM=0) or disabled (bNOSIM=1). In models CWE this parameter has no effect.
- *ColorDescon:* represents the colour in which Measurements and counters are displayed in case the values are erroneous or unknown. Default value is 8421504 (0x808080; grey).
- *bGestAlrSucEnUCS:* Indicates whether the CPX/CPP stores all events and alarms and sends ALL to the HMI every time it is connected (1) or on the contrary (0) the CPX/CPP stores only the events and alarms not sent to the local HMI (namely, the HMI manages the events and alarms, since the CPX/CPP, deletes them once they are sent). The remote HMI always operates as if this parameter is set to 1, no matter how the parameter has been configured (obviated). This parameter must be configured in the local HMI:
  - to **0** if connected to a CPX/CPP model **1CPX-A/1CPP-A**.
  - to **1** if connected to a CPX/CPP model **1CPX-B/1CPP-B**.

  In models CWE this parameter has no effect.

E.g.: **`1,1,0,1,0,0,0,0,0,0,8421504,0,`**

- **Configuration Data of Printer Communications Serial Port: *[line 29]***

Configuration data of the printer only apply to HMI model PCD since it is a WorkStation port where the HMI application is installed. These parameters will not have any effect on the Web HMI, and the manner in which the Web HMI must be configured in order to enable the event printing function is explained in file *ConsoleBaseConfig.xml* as described in section A.22.2.

If the file configuration cannot be read correctly, or the next line does not exist, the configuration used will be the default configuration: “COM2,9600,N,8,1”

Puerto	,	Baudios	,	Paridad	,	DataBit	,	StopBit	,

- *Puerto*: A chain of characters with the name of the PC - HMI serial port through which printer communications are established. It can have the values “COM1” and “COM2”.
- *Baudios*: A number with the baud rate at which printer communications are established. It can have the values of 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800 and 38400.
- *Paridad:* A character with the parity with which printer communications are established. Possible values are ‘N’ for none parity, ‘I’ for odd parity, ‘P’ for even parity, ‘M’ for mark parity and ‘S’ for space parity.
- *DataBit:* Number of bits per serial communications word. Possible values are 5, 6, 7 and 8.
- *StopBit:* Number of serial communications stop bits. Possible values are 1 and 2.

E.g.: **`COM1,9600,N,8,1,`**

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- **Configuration Data for Colours and Blinking of the Screen Header ALARM Identifier.** ***[line 30]***

ColorTxtAlrNoRec	,	ColorFonAlrNoRec	,	ParpaAlrNoRec	,	...

...	ColorTxtAlrRec	,	ColorFonAlrRec	,	ParpaAlrRec	,	...

...	ColorTxtNoAlr	,	ColorFonNoAlr	,	ParpaNoAlr	,

  - *ColorTxtAlrNoRec*: Colour of the ALARM identifier text when there are unacknowledged alarms. If not configured, the HMI takes the default value, RED (16711680).
  - *ColorFonAlrNoRec*: Colour of the ALARM identifier background when there are unacknowledged alarms. If not configured, the HMI takes the default value WHITE (16777205).
  - *ParpaAlrNoRec*: Indicates whether the ALARM identifier must blink or not when there are unacknowledged alarms. If not configured, the HMI takes the default value, which is that it blinks (1).
  - *ColorTxtAlrRec*: Colour of the ALARM identifier text when all the alarms are acknowledged. If not configured, the HMI takes the default value, RED (16711680).
  - *ColorFonAlrRec*: Colour of the ALARM identifier background when all the alarms are acknowledged. If not configured, the HMI takes the default value, WHITE (16777205).
  - *ParpaAlrRec*: Indicates whether the ALARM identifier must blink or not when all the alarms are acknowledged. If not configured, the HMI takes the default value, which is that it does not blink (0).
  - *ColorTxtNoAlr*: Colour of the ALARM identifier text when there are no alarms. If not configured, the HMI takes the default value, WHITE (no text) (16777205).
  - *ColorFonNoAlr*: Colour of the ALARM identifier background when there are no alarms. If not configured, the HMI takes the default value, WHITE (16777205).
  - *ParpaNoAlr*: Indicates whether the ALARM identifier must blink or not when there are no alarms. If not configured, the HMI takes the default value, which is that it does not blink (0).

E.g.: **`16711680,16777205,1,16711680,16777205,0,16777205,16777205,0,`**

- **Data on the Different Types of HMI Users:** ***[lines 32-34]***

The HMI will be configured differently as a function of the user defined:

Case 0: no users.

TipoUsuarios	,

  - *TipoUsuarios*: Will be set to **0**.

E.g.: **`0,`**

BCWE1208A
CWE: Embedded Web HMI
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Case 1: mode of different users to carry out different commands.
This user mode is only valid for HMI model PCD. It is not valid for the Embedded WEB HMI, so that if it is used the normal user configuration will be used (Case 2).

All users may carry out all the operations as usual and the passwords for engineering, protections and superuser are managed as usual. The innovation is that, depending on the user, a signal is activated in the CPX that enables, or not, a number of commands.

TipoUsuarios	,	NumUsuarios	,	ToutSesion	,	ColorTxtIdUsu	,	ColorFonIdUsu	,	
Nombre	,	DirAbrir	,	ISEAbrir	,	DirCerrar	,	ISECerrar	,	...

...	DirEstado	,	ISCEstado	,	(*)

(*) It repeats for each user. There will be as many as indicated by *NumUsuarios*.

- *TipoUsuarios*: It will be set to **1**.
- *NumUsuarios*: Number of users.
- *ToutSesion*: Timeout to automatically close the session (in seconds). This time begins counting again every time a command is issued or a session is opened.
- *ColorTxtIdUsu*: Text colour of the user identifier that will be drawn on the screen header when a session is open. This user identifier will be the contents of field *Nombre*. If it is not configured, the HMI takes GREEN as default value (65280).
- *ColorFonIdUsu*: Background colour of the user identifier that will be drawn on the screen header when a session is open. If it is not configured, the HMI takes BLACK as default value (0).
- *Nombre*: User name (maximum 12 characters).
- *DirAbrir*: Address of the equipment to which the command to open a session of the user *Nombre* belongs.
- *ISEAbrir*: Address of the command to open a session of the user *Nombre*.
- *DirCerrar*: Address of the equipment to which the command to close a session of the user *Nombre* belongs.
- *ISEAbrir*: Address of the command to close a session of the user *Nombre*.
- *DirEstado*: Address of the equipment containing the signal that indicates there is an open session of the user *Nombre*.
- *ISCEstado*: Address of the signal indicating there is an open session of the user *Nombre*.

E.g.:
```
1,2,60,65280,0,
GENERATION,256,0,256,1,256,50,
DISTRIBUTION,256,2,256,3,256,51,
```


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Case 2: mode of different users with different privilege is used:

For HMI model PCD, this mode makes available to the user the following privileges:

- **Commands**: carry out commands, acknowledge/delete alarms, save events to disk, gain access to Reports, Engineering (unable to configure the Central Unit, activate the printer, edit the remote HMI operating options).
- **Control function Protections and Configuration**: gain access to control function Protection and Configuration buttons.
- **Manager**: both of the above privileges, plus the possibility to gain access to all Engineering menu options and also manage users (add, edit or delete).

In the Embedded WEB HMI this mode makes available to the user the following privileges:

- **Command execution**: Grants the current user the privilege of executing commands, which confers the capacity to operate on the system elements.
- **Alarm acknowledgement**: Grants the user the privilege to acknowledge and delete system alarms.
- **User management**: Grants the selected user the privilege to manage the user registry among other actions.
- **Control functions and Applications**: Enables to edit system settings as well as to launch certain applications from the web client.

TipoUsuarios	,	ToutSesion		ColorTxtIdUsu	,	ColorFonIdUsu	,

- *TipoUsuarios*: It will be set to **2**.
- *ToutSesion*: Inactivity timeout to automatically close the current session (in seconds) and automatically open a session for the default user.
- *ColorTxtIdUsu*: Text colour of the active current user identifier that will be drawn to the right part of the screen header. This user identifier will be the name of the user configured when created in the HMI. Default colour is GREEN (65280).
- *ColorFonIdUsu*: Background colour of the active current user identifier that will be drawn to the right part of the screen header. If not configured, the HMI takes BLACK as default value (0).

E.g.: **`2,300,65280,0,`**

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The file becomes:

```
[1]   CLIENT TESTS,1PCD-A2A-510000IA, // Client name and PCD model
[2]   1,1, // Alarms and events sorted
[3]   16777205,16711680,2583960,16711935,  //  Alarm  text  and  background  TYPE
      1,sel. and delete
[4]   16711680,16777216,16776960,8453888, // Alarm text and background TYPE 2,
      sel. and delete
[5]   16777205,16777216,4433285,16747347,  //  Alarm  text  and  background  TYPE
      3,sel. and delete
[6]   65280,16777216, // Event activation text and background
[7]   16776960,16777216, // Event deactivation text and background
[8]   5.000,5,// Connection retry time (s), Time between retries,
[9]   10.000, // Counter request time (s)
[10]  5, // Maximum time (s) between data received to reset connection
[11]  500, // Atr. BUTTON RESERVE (500 = Dimmed, 530 = Invisible, 620 = MODE)
[12]  Vacant, // RESERVE BUTTON text
[13]  # Maximum one character per identifier
[14]   , // Id. of normal alarsuce
[15]  *, // Id. of normal asynchronous alarsuce
[16]  R, // Id. of redund alarsuce
[17]  r,  // Id. of redund asynchronous alarsuce
[18]  I, // Id. of internal alarsuce
[19]  i, // Id. of internal asynchronous alarsuce
[20]  ?, // Id. of unidentified alarsuce
[21]  ¿, // Id. of unidentified asynchronous alarsuce
[22]  # Sound
[23]  1,ding.wav,1,c:\alarm.bat,// Type of sound, sound file
[24]  #Options
[25]  #bDCO,bREM,bGPS,bCONSENNEG,bTEL,bNOSINC,bNOINFRM,bNOCFGCNT,bNOPROT,
[26]  #bNOSIM,colorDescon,bGestAlrSucEnUCS,
[27]  1,1,0,1,0,0,0,0,0,0,8421504,0,
[28]
[29]  #Printer communications port configuration.
[30]  COM1,9600,N,8,1, // Port,Baud,Parity,DataBit,StopBit.
[31]  16711680,16777205,1,16711680,16777205,0,16777205,16777205,0,
[32]  # USERS
[33]  1,2,60,65280,0,
[34]  GENERATION,256,0,256,1,256,50,
[35]  DISTRIBUTION,256,2,256,3,256,51,
```


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A.8 File describing the Status of the SIPCO: SIPCO.CFG

This is the **"sipco.cfg"** file, which contains the images to be displayed on the SIPCO status screen to the various equipment participating: PCD, CPX, printer, remote HMI, Remote control and the CPUs. The file has the following format:

- **Data corresponding to the HMI, Central, Printer, Remote HMI and Remote Control Images: *[lines 1-5]***

ImagenHMI	,
ImagenCentral	,
ImagenPrinter	,
ImagenPCRemoto	,
ImagenRemote control	,

  - *ImagenHMI*: Image assigned to the HMI.
  - *ImagenCentral*: Image assigned to the central unit.
  - *ImagenPrinter*: Image assigned to Printer.
  - *ImagenPCRemoto*: Image assigned to remote HMI.
  - *ImagenRemote control*: Image assigned to Remote control.

```
e.g.: PCD_SOB.BMP,
      CPD_ZIV.BMP,
      PRINTER.BMP,
      REMOTE.BMP,
      TEL.BMP,
```

- **Data corresponding to the Images Displayed in the Various CPUs that are part of the Substation: *[lines 7-10]***

BMPEquipment	,		(*)

(*) This is repeated for each physical equipment belonging to the substation. There will be as many as indicated under field *NumEqFis* in "equipos.cfg" file.

  - *BMPEquipment*: BMP assigned to the physical equipment in question.

```
e.g.: IRD.BMP,// Eq. Physical 1
      8IRD.BMP,// Eq. Physical 2
      …
      MCD.BMP,// Eq. Physical NumEqFis
```

N.B. As regards the Embedded Web HMI , although in the file SIPCO.cfg, images could be presented with extension .bmp, the HMI ignores these extensions. The image files are actually .gif files and are filed in directory "\CfDisk\webcon\Images".

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- **Data corresponding to the Tags for the following Objects which are Displayed on the SIPCO Status Screen: Local HMI, Central Unit, Backup Central Unit, Remote HMI and Remote Control: *[line 11]***

In order to maintain compatibility with the SIPCO Status screen existing to date, **if this line is not configured, the default values indicated below will be applied in each field**:

EtiqPCDLoc	,	EtiqCPX	,	EtiqCPXBck	,	EtiqPCDRem	,	EtiqTelem	,

- *EtiqPCDLoc*: Tag assigned to the Local HMI. The maximum length of the tag is 15 characters. Default value = Without tag. In CWE models, this parameter will not have a default value.
- *EtiqCPX*: Tag assigned to Central Unit. The maximum length of the tag is 15 characters. Default value = Without tag.
- *EtiqCPXBck*: Tag assigned to the Backup Central Unit, when there is a redundancy in "Hot Stand By" Central units, wherein the two HBIs (local and remote), are always connected to the active Central Unit (see parameter *TipoHMI* = 4 in file "redunda.cfg" of the HMI). The maximum length of the tag is 15 characters. Default value = Without tag.
- *EtiqPCDRem*: Tag assigned to remote HMI. The maximum length of the tag is 15 characters. Default value = PCD REMOTE (in the various languages). For CWE models, this parameter will not apply.
- *EtiqTelem*: Tag assigned to Remote control. The maximum length of the tag is 15 characters. Default value = REMOTE CONTROL (in its various languages).

e.g.: **`,,,PCD REMOTE, REMOTE CONTROL,`**

The file will be as follows:

```
[1]   PCD_SOB.BMP, // HMI
[2]   CPD_ZIV.BMP, // Central
[3]   PRINTER.BMP, // Printer
[4]   REMOTE.BMP, // Remote
[5]   TEL.BMP, // Remote control
[6]   # CPU´s
[7]   IRD.BMP, // 1st equipment
[8]   8IRD.BMP,// 2nd equipment
[9]   …
[10]  MCD.BMP,// equipment nº
[11]  ,,,PCD REMOTE, REMOTE CONTROL,
```


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A.9 Network Configuration File: TCP.CFG

This file contains data as regards IP address and the communication ports at TCP protocol level for the Central Unit, as well as the name of the central HMI model. The name of this file is **"tcp.cfg"** and cannot be configured by the client.

The file has the following format:

- **Data regarding Communications from the Central Unit: *[lines 1-4]***

DirIPCentral	,				
PortComLocal	,	PortComRemote	,	LocalPortCom	,
PortAccRemoto	,				
ModeloCPX	,				

- *DirIPCentral*: IP address of the central unit connected to the HMI.
- *PortComLocal*: TCP communications port number of the Central Unit which is to be connected to the Local HMI. This value of this field is **32000**.
- *PortComRemote*: Number of the TCP communications port of the Central Unit which is to be connected to the Remote HMI. The value of this field is **32009** if it is the main Remote HMI, and **32010** if it is an Additional Remote HMI. In CWE models, this parameter will not be applied.
- *LocalPortCom*: Number of TCP local communications port for the HMI equipment, to be used to connect to the Central Unit. Generally speaking, the value of this field is PortComLocal **32000** for local HMI, or PortComRemote **32009** for Remote HMI. If it is configured to 0 (zero) value, an indication is made to the Operating System so that it will use a different port each time it makes a connection. In the case of the Embedded Web HMI , the value of this parameter will be **32080**.
- *PortAccRemoto*: Number of TCP communications port in the Central Unit that is going to connect to the remote access for simulation of the central unit and telnet functionality..The value of this field is **32002**. In CWE models, this parameter will not be applied.
- *ModeloCPX*: HMI-central unit model (maximum number of characters: 15). This value must coincide with the field *ModeloCPX* of the configuration file *"central.cfg"* for the central unit.

e.g.:
```
128.127.60.26,
32000,32009,32000,
32002,
1CPXA03201000WA,
```

The file will be as follows:

```
[1]  128.127.60.26, // IP address of the central unit
[2]  32000,32009,32000,// Nº of the central unit port for local and remote
     HMI,
                        // and local port connecting to the central unit
[3]  32002, // Port for simulation of the CPX
[4]  1CPXA03201000WA, // HMI-central unit Model
```


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A.10 Secondary Network Configuration File: TCPSEC.CFG

This file is only used in Operation HMIs model PCD, and is not applicable to the Embedded Web HMI , since in this last case, the HMI application is integrated to the application of the Substation central unit within the same equipment (Central unit).

This file is used for redundancy of Central Units wherein the HMI is connected to the active Central unit (see parameter *TipoHMI* = 4 of file *"redunda.cfg"* of the HMI). In this case, file *"tcp.cfg"* will hold data from the Main Central Unit (or primary), while file ***"tcpsec.cfg"*** will hold data from the Backup Central Unit (or secondary).

This file has the same format as *"tcp.cfg"* described in the previous paragraph.

A.11 Equipment Configuration File: CONFEQUI.CFG

The name of this file is ***"confequi.cfg"*** and it contains data on equipment and its signals that will be used in the editor of single line diagrams, when assigning the signals to the objects during the screen creation stage.

The file has the following format:

- **General Data for the Substation:** ***[lines 2-4]***

NombSub	,
NumTotEq	,
NumEqFis	,

  - *NombSub*: Name of the substation.
  - *NumTotEq*: Total equipment (physical + logic).
  - *NumEqFis*: Number of physical equipment.

```
e.g.: TEST SYSTEM,
      24,
      20,
```

All the physical equipment for the substation will be configured below (one after the other). The following data is provided for each equipment:

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- **General Data pertaining to the Equipment:** ***[lines 7-9]***

DirEq	,								
UbiEq	,								
N_ISC	,	N_ISE	,	N_ISS	,	N_MEA	,	N_CON	,

  - *DirEq*: Communications' address (PROCOME address).
  - *UbiEq*: Equipment location (maximum number of characters: 9).
  - *N_ISC*: Number of digital signals (ISC).
  - *N_ISE*: Number of controls (ISE).
  - *N_ISS*: Number of output writings (ISS).
  - *N_MEA*: Number of Measurements (MEA).
  - *N_CON*: Number of counters (CON).

e.g.:
```
1,
66 kV HV SYS,
304,34,3,2,4,
```

- **Configuration Data for Digital Signals (ISC):** ***[lines 11-14]***

EtiqISC	,	DescrISC	,		(*)

(*) This is repeated for each ISC. There will be as many as indicated under *N_ISC*.

  - *EtiqISC*: PROCOME tag for the signal.
  - *DescrISC*: Description of the signal (maximum number of characters: 40).

e.g.:
```
0,PRESENCE OF VOLTAGE IN BUS BARS 1,
1,PRESENCE OF VOLTAGE IN BUS BARS 2,
…
303,TRIP 98 CIRC DE TRIP 2ª BOB,
```

- **Configuration Data for the Controls (ISE):** ***[lines 16-19]***

EtiqISE	,	Simp/Dobl	,	DescrISE	,		(*)

(*) This is repeated for each ISE. There will be as many as indicated under *N_ISE*.

  - *EtiqISE*: PROCOME tag for the control.
  - *Simpl/Dobl*: Bit that indicates whether the control is simple (0) or double (1).
  - *DescrISE*: Description of the control (maximum number of characters: 40).

e.g.:
```
0,0,COMMAND TO SWITCH TO LOCAL,
1,0,COMMAND TO SWITCH TO REMOTE CONTROL,
…
33,0,RESERVE 33,
```


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- **Configuration Data for Output Writings (ISS): *[lines 21-23]***

  EtiqISS , DescrISS , ⌐ (*)

  (*) This is repeated for each ISS. There will be as many as indicated under *N_ISS*.

  - *EtiqISS*: PROCOME tag for the output writings.
  - *DescrISS*: Description for the output writings (maximum number of characters: 40).

```
e.g.: 0,TRIP 86 T-1,
      1,TRIP 86 T-2,
      2,'H' IN AUTOMATIC MODE,
```

- **Configuration Data for Measurements (MEA): *[lines 25-26]***

  EtiqMEA , DescrMEA , ⌐ (*)

  (*) This is repeated for each MEA. There will be as many as indicated under *N_MEA*.

  - *EtiqMEA*: PROCOME tag for the MEASUREMENT.
  - *DescrMEA*: Description of the MEASUREMENT (maximum number of characters: 40).

```
e.g.: 0,VOLTAGE MEASUREMENT IN LINE 1,
      1,VOLTAGE MEASUREMENT IN LINE 2,
```

- **Configuration Data for the Counters (CON): *[lines 28-31]***

  EtiqCON , DescrCON , ⌐ (*)

  (*) This is repeated for each CON. There will be as many as indicated under *N_CON*.

  - *EtiqCON*: PROCOME tag for the counter.
  - *DescrCON*: Description of the counter (maximum number of characters: 40).

```
e.g.: 0, BUSBAR ACTIVE POWER INPUT ,
      1, BUSBAR ACTIVE POWER OUTPUT ,
      …
      3, BUSBAR REACTIVE POWER OUTPUT ,
```


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The file will be as follows:

```
[1]   # SUBSTATION
[2]   TEST SYSTEM, // Name of the substation
[3]   24, // Total equipment
[4]   20, // Number of physical equipment
[5]   #
[6]   # Equipment                    EQUIPMENT 1 (SYSTEM 66KV)
[7]   1, // PROCOME address
[8]   66kV HV SYS, // Equipment location
[9]   304,34,3,2,4, // ISC,ISE,ISS,MEA,CON Nº,
[10]  # ISC                          ISC signals
[11]  0,PRESENCE OF VOLTAGE IN BUS BARS 1, // Signal and associated text
[12]  1,PRESENCE OF VOLTAGE IN BUS BARS 2, // Signal and associated text
[13]  …
[14]  303,TRIP 98 CIRC DE TRIP 2ªBOB,// Signal and associated text
[15]  # ISE                          ISE signals
[16]  0,0,COMMAND TO SWITCH TO LOCAL, //   Signal,   Simple(0)-Double(1)   and
      associated text
[17]  1,0, COMMAND TO SWITCH TO REMOTE CONTROL,
[18]  …
[19]  33,0,RESERVE 33,// Signal, Simple(0)-Double(1) and associated text
[20]  # ISS                          ISS signals
[21]  0,TRIP 86 T-1, // Signal and associated text
[22]  1,TRIP 86 T-2,
[23]  2,'H' IN AUTOMATIC MODE,// Signal and associated text
[24]  # MEA                          MEA signals
[25]  0,VOLTAGE MEASUREMENT IN LINE 1, // Signal and associated text
[26]  1,VOLTAGE MEASUREMENT IN LINE 2, // Signal and associated text
[27]  # CON                          CON signals
[28]  0,BUSBAR ACTIVE POWER INPUT,// Signal and associated text
[29]  1,BUSBAR ACTIVE POWER OUTPUT,
[30]  …
[31]  3, BUSBAR REACTIVE POWER OUTPUT ,// Signal and associated text
[32]  # Equipment                    EQUIPMENT 7 (TRANSF-A 13kV)
[33]  …
```


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A.12 Protection Files: PROTEC.CFG

This file contains the programs that will be implemented when the general menu buttons corresponding to PROTECTIONS MEASUREMENTS or REPORTS are pressed. The name of this file is **"protec.cfg"**. The file has the following format:

- **Data regarding the Applications that can be launched from the HMI*: [lines 1-11]***

NumProgPRO	,	NumProgMED	,	NumProgINF	,
NombBotPRO	,				
PathEjecPRO	,				
NombBotMED	,				
PathEjecMED	,				
NombBotINF	,				
PathEjecINF	,				

(*) (**) (***)

(*) This is repeated for each *protection* program defined. There will be as many as indicated under *NumProgPRO*.

(**) This is repeated for each *MEASUREMENT* program defined. There will be as many as indicated under *NumProgMED*.

(***) This is repeated for each *report* program defined. There will be as many as indicated under *NumProgINF*.

- *NumProgPRO*: Number of programs to be run when option PROTECTIONS from the general menu is pressed.
- *NumProgMED*: Number of programs to be run when option MEASUREMENTS from the general menu is pressed.
- *NumProgINF*: Number of programs to be run when option REPORTS from the general menu is pressed .
- *NombBotPRO*: Name for the application as it is displayed on the HMI screen, when various applications are defined for the PROTECTIONS button, which enables choosing among such applications as defined in this file (maximum number of characters: 20).
- *PathEjecPRO*: Path for the program to be run when pressing the PROTECTIONS button from the general menu .
- *NombBotMED*: Name for the application in the HMI window, which is displayed when various applications have been defined for the MEASUREMENTS button, which enables choosing among the different applications defined in this file (maximum number of characters: 20).
- *PathEjecMED*: Path for the program to be run when pressing the MEASUREMENTS button
- *NombBotINF*: Name of the application in the HMI screen, which is displayed when various applications are defined for the REPORTS button. This enables choosing among the different applications defined in this file (maximum number of characters: 20). If internal reports are to be activated, one must type "INFORMINTERNO". If one wishes to activate the trend curve reports, power reports and the events historical data (PLUS reports), one must type "GRAPHIC REPORTS".

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- *PathEjecINF*: Path for the program to be run when pressing the REPORTS button in the general menu. If this involves internal reports, or PLUS reports (trend curves, power reports and events historical data), this field is not used, and will remain empty.

```
e.g.:1,0,3,// Protections – Measurements - Reports
   // Application 1 for PROTECTIONS
   ZIVERCOM,
   c:\zivercom\foxw2600.esl -t zivercom.exe,
   // Application 1 for REPORTS
   REPORTS,
   c:\reports\reports.exe,
   // Application 2 for REPORTS (internal reports)
   INFORMINTERNO,
   ,
   // Application 3 for REPORTS (reports PLUS)
   GRAPHIC REPORTS,
   ,
```

The file will be as follows:

```
[1]   #CONFIGURATION
[2]   1,0,3, // Nº of programs for protections (protect, Measurements, reports)
[3]   # Application 1 for PROTECTIONS
[4]   ZIVERCOM,  // Name of the button
[5]   c:\zivercom\foxw2600.esl -t zivercom.exe, // Path for the executable
[6]   # Application 1 for REPORTS
[7]   REPORTS, // Name of the  application
[8]   c:\reports\reports.exe, // Path for the executable
[9]   # Application 2 for REPORTS (internal reports)
[10]  INFORMINTERNO, // Name of the  application
[11]  , // Path for the executable
[12]  # Application 3 for REPORTS (reports PLUS)
[13]  GRAPHIC REPORTS, // Name of the  application
[14]  , // Path for the executable
```


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A.13 PLUS Report File for: INFPLUS.CFG

This file contains the configuration of the parameters required for the application of reports PLUS, i.e., reports of *trend curves, power reports, and events historical data.* The name of this file is **"infplus.cfg"**. The file has the following format:

- **Data that Indicates if Historical Data on Events is going to be generated: *[line 3]***

GeneraHistEventos	,

  - *GeneraHistEventos*: Indicates if the HMI is going to generate the files with the historical data on events (1) or not (0). If it is set to 1, a file will be generated every day ("*AAMMDDisc.txt*") with the events that have taken place on such a day DD, on the month MM, of the year AA. This file will be automatically generated by the HMI between 00:01 and 00:10 the following day.

e.g.:**1,**

- **MEASUREMENT Data for the *Trend Curve* Report: *[lines 6-10]***

NumMEAs	,			
DirEqMEA	,	EtiqMea	,	(*)

(*) It is repeated for each MEASUREMENT that has been defined. There will be as many as indicated under *NumMEAs*.

  - *NumMEAs*: Number of Measurements that can be chosen for display in the trend curve report.
  - *DirEqMEA*: Address of the equipment that the MEASUREMENT belongs to.
  - *EtiqMEA*: MEASUREMENT tag .

```
e.g.: 4,// Number of Measurements
      10,0,// MEASUREMENT 1
      10,3,// MEASUREMENT 2
      10,6,// MEASUREMENT 3
      10,7,// MEASUREMENT 4
```

- **Counter Data for the *Energy Reports*: *[lines 10-18]***

NumCONs	,	Interval	,	
DirEqCON	,	EtiqCON	,	(*)

(*) It is repeated for each of the defined counters. There will be as many as indicated under *NumCONs*.

  - *NumCONs*: Number of counters that can be chosen to be displayed in the power reports.
  - *Interval*: Indicates the minimum interval in minutes to calculate counter values accumulated. If, for example, it should be configured at 15 minutes, if the period to be displayed is small, the counter value accumulated for 15 minutes will be displayed. If the period is longer, longer intervals will be displayed (accumulated during 30 minutes, 1 hour …). By default, an interval of 15 minutes will be configured.

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- *DirEqCON*: Address of the equipment that the counter belongs to.
- *EtiqCON*: Tag for the counter.

```
e.g.: 5,15,// Nº of Counters, Interval,
      10,0,// Counter 1
      10,1,// Counter 2
      10,2,// Counter 3
      10,3,// Counter 4
      10,4,// Counter 5
```

The file will be as follows:

```
[1]   # FILE INFPLUS.CFG
[2]   # Events historical data (changes)
[3]   1,
[4]   #
[5]   # Trend curves (Measurements)
[6]   4,// NumMedidas,
[7]   10,0,//  MEASUREMENT 1
[8]   10,3,//  MEASUREMENT 2
[9]   10,6,//  MEASUREMENT 3
[10]  10,7,//  MEASUREMENT 4
[11]  #
[12]  # Power reports (Counters)
[13]  5,15,// NumCont, Interval (minutes),
[14]  10,0,//  COUNTER 1
[15]  10,1,//  COUNTER 2
[16]  10,2,//  COUNTER 3
[17]  10,3,//  COUNTER 4
[18]  10,4,//  COUNTER 5
```


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A.14 Internal Report File: REPORTS.CFG

This file contains the configuration of the parameters required for the application of internal reports. The name of this file is ***"reports.cfg"***. The file has the following format:

- **Data regarding the Type of reports that can be configured: *[line 1]***

InfMEAs	,	InfISCs	,	InfCONs	,

  - *InfMEAs*: Enabling of MEASUREMENT Reports. It indicates if these reports can be visualized. They can be configured, but ensure that the data will not be displayed (0: No MEASUREMENT reports; 1: There are MEASUREMENT reports).
  - *InfISCs*: Enabling of digital Signal Reports (ISCs). It indicates if these reports can visualized. They can be can be configured, but cannot be visualized (0: No Signal reports; 1: There are Signal reports).
  - *InfCONs*: Enabling of Reports on Counters. This indicates if these reports can be visualized. They can be configured, but cannot be visualized (0: There are no reports on Counters; 1: There are reports on Counters).

- **Capture Timing Data: Intervals: *[line 2]***

IntervMEAs	,	IntervCONs	,

  - *IntervMEAs*: Interval of samples capture time for MEASUREMENT records. The value is expressed in minutes. It must always be configured with a value of 1 minute, because this is the value used by the CPX software (where it is not configurable).
  - *IntervCONs*: Interval of samples capture time for Counter records. The value is expressed in minutes and must coincide with the value configured in the CPX *"historic.cfg"* file, for sample taking of the counters in the substation. The default value will be 15 minutes.

- **Data regarding the Type of Reports to be Generated: *[line 3]***

TipoInform	,

  - *TipoInform*: Type of report, in text file format, to be generated after reading the CPX data. 0 = Normal Report; 1 = Pena Luisa Report.

The file will be as follows:

```
[1]  1,1,1, // INF MEAS, INF ISC, INF CON
[2]  1,15,// Interval of MEASUREMENT samples, Interv. CON samples
[3]  1,// Pena Luisa type
```


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A.15 HMI Redundancy File: REDUNDA.CFG

This file is only used for HMIs Operation on model PCD, and is not applicable to the Embedded Web HMI , since in this last case, the HMI application is integrated in the application of the Substation central unit within the same equipment (Central unit).

The name of this file is **"redunda.cfg"** and contains data on HMIs redundancy. The file has the following format:

- **General Data on Redundancy: *[lines 2-3]***

TipoHMI	,
NumAplic	,

  - *TipoHMI*: HMI type: primary (1) or secondary (2).
    For the case of redundancy of Central Units Hot Stand By (HSB), this parameter could be set with the following values:
    Normal HSB redundancy (where there are HMIs, each of which is connected to a Central Unit).
    HSB Redundancy where both HMIs (local and remote) are connected to the active Central Unit.
  - *NumAplic*: Number of redundant applications. Due to the fact that, for the time being, redundancy is only carried out on ***Zivercom***®, this number will always be set to 1. **This parameter is set to 0 for Hot Stand By redundancy (for *TipoHMI*=3 or *TipoHMI*=4).**

e.g.:
```
1,
1,
```

For each application defined as redundant, the following will be displayed:

- **General Data on Applications: *[lines 7-13]***

This data shall not be configured for Hot Stand By redundancy (for *TipoHMI*=3 or *TipoHMI*=4).

PathLocal	,
PathRemoto	,
NombEjec	,
NumTipoArchivo	,
Extension	,

(*)

(*) This is repeated for each type of file as defined under the field *NumTipoArchivo*.

  - *PathLocal*: Path for local (without the last back-slash).
  - *PathRemoto*: Path for the remote (without the last back-slash).
  - *NombEjec*: Name of the executable for the application.
  - *NumTipoArchivo*: Number of types of files to be checked.
  - *Extension*: Extension for each type of file.

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e.g.:
```
c:\zivercom,
d:,
zivercom.exe,
3,// Nº for file types
dbf,
osc,
cdx,
```

- **Data regarding the Commands that can be Issued: *[lines 14-15]***

DirEq	,	EtiqISE	,	DirEqEncl	,	EtiqEncl	,	NegEncl	,
MensEncl	,								

  - *DirEq*: Address for the equipment that the control belongs to.
  - *EtiqISE*: PROCOME tag for the only command that can issued by the secondary.
  - *DirEqEncl*: Address of the equipment that the interlocking belongs to for the rest of the commnads.
  - *EtiqEncl*: PROCOME tag of the interlocking for the rest of the commands.
  - *NegEncl*: Rejection bit of the interlocking for the rest of the commands.
  - *MensEncl*: Message that is displayed on the screen when the above interlocking occurs.

e.g.:
```
269,0,269,2,1,
Passive HMI,
```

- **Data Corresponding to Future TCP Connection to the other HMI : *[lines 16-20]***

This data will not be configured for the Hot Stand By redundancy (for *TipoHMI*=3 or *TipoHMI*=4).

DirIPHMI	,
PuertoComs	,
TimeReint	,
Timeout	,
ModeloPCDCPX	,

  - *DirIPHMI*: IP address of the other HMI .
  - *PuertoComs*: Number of TCP communications port to which it is connected .
  - *TimeReint*: Connection retry time (in seconds).
  - *Timeout*: Timeout time (in seconds).
  - *ModeloPCDCPX*: Model for the other CPX.

e.g.:
```
128.127.90.55,
33100,
5,
10,
1CPXA03201000WA,
```


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The file will be as follows:

```
[1]   #REDUNDANCY
[2]   1, // Primary = 1, Secondary = 2
[3]   1, // Number of redundant applications: 1 or 0
[4]   #
[5]   # Do not set the last back-slash for the paths
[6]   #
[7]   c:\zivercom, // Local path
[8]   d:, // Remote path
[9]   zivercom.exe, // Name of the executable
[10]  3, // Number of types of files to be checked
[11]  dbf, // Zivercom database
[12]  osc,
[13]  cdx,
[14]  269, 0, 269, 2, 1, // Control (dir, ise), Interlocking (dir, isc, neg)
[15]  HMI Passive, // Interlocking message
[16]  128.127.62.16, // IP address of the other HMI
[17]  32100, // Communications port Nº
[18]  5, // Retry time (sec.).
[19]  10, // Timeout (sec.).
[20]  1CPXA03201000WA, // HMI-central unit model.
```

As regards Hot Stand By redundancy, this file has the following format:

```
[1]   #REDUNDANCY
[2]   1, // HSB normal=3, HSB with HMIs cx. ACTIVE=4
[3]   0, // Number of redundant applications: 0
[4]   269, 0, 269, 2, 1, // Command (dir, ise), Interlocking (dir, isc, neg)
[5]   HMI Passive, // Interlocking message
```


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A.16 HMI Type File: SUBEST.CFG

This file is only used in Operation HMIs model PCD, and is not applicable to the Embedded Web HMI .

The name of this file is ***"subest.cfg"*** and contains the type of HMI. This file **does not exist for local HMI**.

The file has the following format:

- **Data Regarding the Type of HMI: *[line 1]***

TipoHMI	,

  - *TipoHMI*: The HMI can be one of the following types:

1: Remote HMI with connection to the CPX/CPP via modem.
2: HMI *local* with connection to the CPX/CPP via modem.
3: Remote HMI with connection to the CPX/CPP via local network.

e.g.:**1,**

- **Data Regarding Timeout to hang up the Telephone Line**

This parameter only makes sense when connection to the CPX/CPP is made via a modem, i.e., in HMIs whose parameter *TipoHMI* is 1 or 2: *[line 2]*

TimeoutColgar	,

  - *TimeoutColgar*: Maximum time (in seconds) for the HMI to actually hang up the telephone connection from the moment it issues a command to the modem to hang up. The aim is to avoid that PCD and CPX/CPP try to connect again when the previous connection has not been cut off. The default value is **20 seconds.**

e.g.: **30,**

The file will be as follows:

```
[1]   1,   // HMI Type
[2]   30,// Timeout for hanging up telephone connection
```

N.B.: all HMIs type 1 and 2 will include among its configuration files a "*.sub" type file
All HMIs, type 1 and 3 will include file "remote.cfg" in its configuration files.

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A.17 File for Connection to Substation via Modem: NombreSubstation.SUB

This file is only used for Operation HMIs model PCD, and it is not applicable for Embedded Web HMI, since in this last case, the HMI application is integrated with the Substation Central Unit application, within the same equipment (Central unit), and, consequently, the connection of a remote Web Client via modem to the Embedded Web HMI will be carried out through the Remote Access Server (RAS) of the Central unit itself (refer to annex B of the HMI manual, which describes the configuration procedure for the remote connection for Web clients, and annex A.15 of the Central unit manual, which describes the file for configuration of the Remote Access Server for the Central unit).

There will be a file of this kind for each of the substations that have a Central unit, to which an HMI will be connected (local or remote) **via modem**. The name of this file is **"*NombreSubstation*.sub"**, and *NombreSubstation* is the name of the substation to which the HMI is going to be connected via modem. This name **must coincide** with the parameter *NombDir* that is included in the file.

Hence, this file is for the configuration of the local and remote HMIs that use the connection via modem (types 1 and 2 in the file "subest.cfg"), and contains data pertaining to the substation to which the HMI will be connected. An HMI with capacity to connect to various substations will have a file for **"*.sub"** type for each of the substations to which connection is required (i.e.: if it wishes to connect to substations *Substation 1*, *Substation 2* and *Substation 3*, it would have to have 3 files designated, for example, *"Subest1.sub"*, *"Subest2.sub"* and *"Subest3.sub"*).

The file has the following format:

- **Data regarding the Substation that can be accessed via the Modem : *[lines 1-3]***

NombDir	,	NombSubest	,		
NumTelef	,	User	,	Password	,
Reint?	,	NumReint	,	TimeRecon	,

  - *NombDir*: Indicates the name wherein the configuration files are stored to communicate with that substation (it will be directory ..*bin**NombDir*\) (maximum number of characters = 8).

IMPORTANT: This name must coincide with file named *"*.sub"*.

  - *NombSubest*: Indicates the name of the substation (maximum number of characters = 20). This name will be displayed on the substation selection box (see 5.1 under Chapter 5), which is displayed when starting up an HMI type 1 and 2.
  - *NumTelef*: Indicates the telephone number used by the modem to call the HMI.
  - *User*: Indicates the user through which the HMI will connect to the central unit (maximum number of characters: 8). The default value is **ZIV**. This field must coincide with the field *Usuario* of file *"rassrv.cfg"* in the central unit.

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- *Password*: Indicates the password to enable the HMI to connect to the central unit. The default password is **ZIV**.
- This field must coincide with the *Password* field in file *"rassrv.cfg"* of the central unit.
- *Reint*?: Indicates whether the HMI will retry the connection (1) or not (0) when connection between modems is lost.
- *NumReint*: Maximum number of connection retries from the HMI before displaying a failed connection message.
- *TimeRecon*: Time between connection retries (in seconds).

e.g.:
```
Subest1,SUBSTATION 1,
433,ZIV,ZIV,
1,3,15,
```

The file will be as follows:

```
[1]  Subest1,SUBSTATION 1,   // Name of directory, Name of substation
[2]  433,ZIV,ZIV,   // Telephone Nº, User, Password
[3]  1,3,15,   // Retries?, Num. Retries, Time between retries.
```

A.18 Remote HMI Configuration File: REMOTE.CFG

This file is only used for Operation HMIs model PCD, and it is not applicable to the Embedded Web HMI , since in this last case the HMI application is integrated with the central unit Substation application within the same equipment (Central unit), and based on the parameters configured under file ***ConsoleBaseConfig.xml*** for the Embedded Web HMI (please refer to section ***"Local/Remote mode Parameter"*** in chapter A.22.2 of this annex), each remote Web Client will have the capacity to carry out actions on the Central unit's HMI, depending on the privileges assigned to the active user in the Client Web at the time.

This file contains the configuration data for the Remote HMI as regards the possibility of issuing commands and alarm recognitions. It also includes a timeout for the reception of alarm and event files. The file has the following format:

- **Data regarding the possibility of issuing Commands and recognizing Alarms: *[line 1]***

Mandos	,	RecRemoto	,	RecLocal	,	ModifOnLine	,

  - *Controls*: This bit indicates whether the user can issue commands from the Remote HMI (1) or not (0). This parameter depends on the value of the analogue parameter located in the Central unit (under file *"remote.cfg"*), which indicates if the remote control can issue commands, or not. If commands are not enabled at Central unit level, even if parameters *Controls* are set to 1, commands will never be enabled from the Remote HMI. The default value will be **0**, i.e., commands will not be enabled.
  - *ReconocRemoto*: This bit indicates whether the user can acknowledge the alarms from the Central unit (1), or not (0). Value 1 enables acknowledged alarms to also be acknowledged in the local HMI. The default value will be **0**, i.e., alarms cannot be acknowledged in the CPX.

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- *ReconocLocal*: This bit indicates whether the user can acknowledge the alarms in the Remote HMI (1) itself, or not (0). The value of the bit *ReconocRemoto* will determine if they will also be acknowledged in the Central unit. If *ReconocRemoto* bit is set to 1, the value of the bit *ReconocLocal* (which is supposed to be set to 1), is ignored because if alarms are acknowledged in the Central unit, it is only logical that they will also be acknowledged in your own HMI. Setting to 0 only makes sense when you do not want to enable any kind of recognition of alarms. The default value will be **0**, i.e., alarms cannot be acknowledged locally.
- *ModifOnLine*: This bit indicates if the mode of operation for the Remote HMI, indicated by bits *Mandos*, *RecRemoto, and RecLocal* can be edited (1), or not (0). This parameter will not modify the value of the above three bits. For example, with the bits set to 0,0,0,1 (mode which is only used for monitoring, but which offers the possibility of modifying the same), the user could configure the possibility of issuing commands. In this case, the user could issue whatever commands, as required. As it does not modify the value of the bits, if one exits and enters the Remote HMI once more, this will start up in monitoring only mode, hence commands would not be enabled after this. One **0** in this bit, indicates that the user cannot ever modify the operation mode of the Remote HMI from the HMI itself. This will be the default value.

e.g.: **`1,1,1,1,`**

- **Data regarding the Timeout for Reception of Alarm and Event Files: *[line 2]***

TimeoutRX	,

  - *TimeoutRX*: Timeout (in seconds) to deem the reception of alarm and event files from the Central unit as being faulty.

e.g.: **`30,`**

The file will be as follows:

```
[1]        1,1,1,1,   // Controls, RecRemoto, RecLocal, ModifOnLine,
[2]        30,   // Timeout for reception of files (seconds)
```


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A.19 Task Run File: RUN.CFG

This file is only used for Operation HMIs model PCD, and is not applicable to Embedded Web HMI , since in this last case, the HMI application is integrated in the Substation central unit application within the same equipment (Central unit).

The name of this file is ***"run.cfg"*** and contains the full name (including path) of an application that is automatically and simultaneously run with the HMI. This application ends automatically when the running of the HMI ends. It is used for the HMI Wisp. The file has the following format:

- **Name of the application:** ***[line 1]***

Nombre_application_con_path	,

A.20 Single Line Diagram File: UNIFILAR.CFG

This file is created using an application called ***Zivergraph***® (Single line diagram editor).

A.21 SIPCOVisualConf.cfg File

This file contains all the information related to the visual structure of the SIPCO page, and is solely and exclusively used for the Embedded Web HMI as a standard template to create the SIPCO.svg graphic file for each substation.

The file does not contain any information that can be useful to the user, and, hence, it must not be modified.

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A.22 ConsoleBaseConfig.xml

This is the main configuration file for the Embedded Web HMI , understood as being a repository for a large part of the information contained in the configuration files seen to date, and which also incorporates extra information as required for the correct performance of the applications.

The file **ConsoleBaseConfig.xml** contains most of the parameters that affect the performance of the HMI with the values applied by default by these parameters. Generally speaking, these values are only applied when the rest of the configuration files do not incorporate the same, otherwise the file updates its values with those configured in other files.

For example, if red (FF0000) appears as the colour for active alarms in file **ConsoleBaseConfig.xml**, and nevertheless, the colour assigned for file **cliente.cfg** is blue (0000FF), ConsoleBaseConfig.xml would modify its parameter each time it is booted so that it would use the blue colour.

This implies that user modifications for HMI configuration must be carried out, whenever applicable, on **CFG** files, or otherwise, they would not be effective.

The file ConsoleBaseConfig.xml is not physically modified, but the updating of its parameters is made on a copy of the same that the HMI has stored in its memory, in such a way that with each new booting, the file would maintain the original default values.

The process that the HMI applies when it is booted is as follows:

- Load the ConsoleBaseConfig.xml file in the memory.
- It updates certain parameters that must be changed and kept (such as, for example, the last date when a file was edited) and it records it again in the system.
- It modifies the file parameters contained in the memory based on the rest of the configuration files.
- It generates the configuration files as required for the correct performance of the client web pages based on its content.

The file **ConsoleBaseConfig.xml** contains a great deal of information, but most of this should not be edited by the user. The list of parameters for this file that can be edited by the user and its function is listed under section

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A.22.1 Finding and Editing Parameters

The process to be applied to edit a parameter from file **ConsoleBaseConfig.xml** is as follows:

- Open file **ConsoleBaseConfig.xml** with some text editor with search function, such as, for example, WordPad or Codewright.
- Introduce the parameter identifier that you wish to edit (obtained from the reference in this document) with the search engine.
- One the parameter line has been localized within the document, update the attribute **value**, with the new value.
- Record the file and copy it again in the UCS. The name of the directory is "**\CfDisk\webcon\bin**".
- Restart the HMI application. As mentioned above, no change in the configuration will be effective until the HMI is not rebooted.

Example:

The user wishes to activate the remote printer in the system. The steps to be applied are as follows:

- Through this reference manual, obtain the identifier of the printer parameter (**ConsoleHasSystemAPrinter**).
- Download the file **ConsoleBaseConfig.xml** from directory **\CfDisk\webcon\bin** of the **UCS** and save it in your PC.
- Open the file with the WordPad and select **Edition -> Search** from the application menu.
- Introduce the chain **ConsoleHasSystemAPrinter** in the search dialogue and select the option **Buscar** (**Search).**
- Once the line has been localized, the user will visualize the following text:

  <VALUE id="ConsoleHasSystemAPrinter" value="no" />
- As described in this document, the **value** of the attribute must be changed for **yes**, hence the line will be as follows:
  <VALUE id="ConsoleHasSystemAPrinter" value="si" />
- Then, the only thing that remains to be done is saving the file, copying it again in the UCS and the HMI web must be rebooted.

N.B.: Capital and lower case letters are taken into account. "YES", "Yes" and "yes" are different values. The only one that is valid to activate the printer, as explained under the description, is "yes".

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A.22.2 User Editable ConsoleBaseConfig.xml file Parameters

A.22.2.a Parameters Related to the Web Server's IP

- **ServerCurrentIP:** IP of the web server for the HMI (e.g.. **value="128.127.170.5"**). If it is not indicated (**value="-"**) the HMI will automatically determine the IP of the system that it is running on, based on other configuration parameters.
- **AreConsoleAndUCSInTheSameDevice:** Indicates whether the HMI application and the central unit application run on the same system. The values admitted by this parameter are, therefore, "**yes"** and "**no**".
- **CurrentCentralIPDirection:** IP of the central unit to which the HMI is connected If value "**-**" is configured, the HMI will set up this value from file **tcp.cfg**.

The process applied to determine the system's IP, is as follows:

a) If parameter **AreConsoleAndUCSInTheSameDevice** has value "**yes**" assigned to the same, the HMI sets up the IP configured for the UCS in file **Tcp.cfg**.
b) In the event that the above parameter is set to "**no**" (default value), the HMI checks the parameter **ServerCurrentIP**. If this parameter is set to "**-**" the HMI will automatically detect the system's IP. If this is not the case, the value associated to parameter **ServerCurrentIP** will be used as IP.

A.22.2.b Parameters Related to the Connection

- **ConsoleNMaxConnectedClients:** Maximum number of web clients that can simultaneously connect to the HMI. If someone tries to connect when the number specified for connected clients is in full use, the new connection attempt will be rejected. Default value "**3**". It is recommended that a value above "**3**" should not be set, because the performance of the system could be affected.
- **CommunicationsChannelPerformance:** The value "**low**" indicates that the communication channel between the HMI and the web clients is slow, hence the system will perform under "low performance" mode, which implies, for example, that the disconnect times when there is no communication will be faster than normal, or that the graphic appearance of the web client will be more simple. Any other value will make the system perform under normal mode.

A.22.2.c Local / Remote Mode Parameters

- **IsConsoleInLocalRemoteMode:** Determines whether the HMI will boot in local/remote mode. Values **"y"**, **"yes"**, **"s"** and **"si"** (in any combination of capital/lower case letters) will activate this mode. Any other value will make the HMI boot under general mode.
- **LocalClientIp:** When the HMI is in local/remote mode, this parameter will set the client's IP, which will be considered local. The rest of the clients connecting to the system will be considered remote clients. It admits any value that maintains the IP format (e.g.. **value="128.127.170.5"**). In the event that this parameter does not correspond to an IP, the system will boot in general mode, independently from what the parameter **IsConsoleInLocalRemoteMode** indicates.

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- **LocalRemoteDefaultStatus:** Establishes whether the HMI application will boot by default on either local or remote status. The **remote**" value in any combination of capital/lower case letters, will cause booting in remote mode. Any other value will cause booting in local mode.
- **RemoteClientsCannotExecuteOrders:** Values "**yes**", "**y**", "**si**" and "**s**" (in any combination of capital/lower case letters) entail that remote clients can never issue commands on the system (not even when the system is in remote mode).

A.22.2.d Printer Parameters

- **ConsoleHasSystemAPrinter:** Indicates if there is a remote printer connected to the system, in which case, the value of this parameter must be "**yes**". Any other value will deactivate the printing functionality.
- ConsolePrinterConexType: Type of connection through which the HMI will communicate with the remote printer. It can use the following values:
  - **a)** **WebService:** Connection will be made via the Web Service installed in the equipment to which the printer is connected.
  - **b)** **PrinterServer:** Connection will be made via a printer server.
- **PrinterIP:** IP for the equipment to which the printer is connected.
- **CarriageReturnChar:** The value of this parameter will be added at the end of each line of text forwarded to the printer. It can be used simply to define the character for the new line, or to add a comment / tag to each of the texts forwarded for printing.
- **PrinterPort:** Name of the port to which the printer is connected. For example, "**LPT1**". This parameter is only used for systems to which the printer has been connected through a printer server (ConsolePrinterConexType: "**PrinterServer**").
- **ConsolePrinterQueue:** Name of the print queue associated to the printer. For example, "**GenericHP**". This parameter is only used for systems to which the printer has been connected via a printer server (ConsolePrinterConexType: "**PrinterServer**").

A.22.2.e User Parameters

- **ClientConsoleSesionesDeUsuariosTimeoutDesconexion:** Inactivity time in seconds, after which the active user session will be closed down and it will go on to default user. For example, the default value "**3600**" indicates that any open user session in the web client will shut down, activating the default user session, if 3600 seconds (one hour) lapse since the user interacts with the HMI.
- **ConsoleRegisteredUsersActionsMaxLineSize:** Maximum length of each line in the file that receives the actions executed by the users on the system. Default value "**182**".
- **ConsoleRegisteredUsersActionsMaxNumber:** Maximum number of inputs for logging of operations executed on the system, which can be stored (**See section 4.4.5.8**). Default value "**5000**".

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A.22.2.f System Refresh Parameters

- **ConsoleSecondsToRestartEquipmentRefresh:** Period in seconds wherein the HMI requests complete refresh of the substation status from the central unit. Default value "**900**".
- **ConsoleMiliSecondsBetweenSingleEquipmentRefresh:** Period in milliseconds spent between refresh requests for each equipment when a full refresh is being carried out. Default value "**1000**".
- **ConsoleSecondsBetweenMEASUREMENTsRefresh:** Period in seconds wherein the HMI requests updating of the Measurements pertaining to the system from the UCS . Default value "**1**".

A.22.2.g Parameters for the Controlled Restart of the Web Client

- **ClientWeeksBetweenClientRestart:** Number of weeks lapsed after which the client web page will be restarted. The value "**0**" deactivates this action.
- **ClientDayOfWeekForClientRestart:** Day of the week when the client web will be restarted. Possible values range from "**0**" (Sunday) to "**6**" (Saturday).
- **ClientHourOfDayForClientRestart:** Hour for the restart. Possible values range from "**0**" to "**23**".

Thus, the following configuration:

ClientWeeksBetweenClientRestart:value="4"
ClientDayOfWeekForClientRestart:value="0"
ClientHourOfDayForClientRestart:value="3"

Sets the restart of the web client every 4 weeks (on Sunday at 3 am).

A.22.2.h Configuration Parameters for the UCSConf

- **UcsConfMainPage:** Determines whether the system implements the UCSConf. Any value other than "" will entail that the system implements the same.
- **UcsConfButtonsText:** Text that will be displayed in the button for the UCSConf screen.
- **UCSConfServerIP:** IP address for the UCSConf server(e.g.. "128.127.170.3").

UCSConfLanguage: Language configured for the UCSConf. The values admitted are: "ES", "PT" and "EN", which entail, Spanish, Portuguese and English, respectively.

A.22.2.i Miscellaneous

- **ConsoleCurrentLanguage**: Indicates the language for the installation of the HMI. Default value "**0**". Valid values are:
  a) "**0**" Spanish.
  b) "**1**" Portuguese.
  c) "**2**" English.
- **ConsoleAutoGeneracionFicherosUnifilar:** Indicates whether the HMI must automatically regenerate its associated files when it detects any change in the configuration. Possible values "**yes**" and **"no**". Default value "**yes**".

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- ConsoleFontTypePriority: Font type priority to be used for the single line diagram. Possible values are:
  a) "quality": Higher graphic quality for the font. It is the default value.
  b) "adjust": Use if alignment problems arise, or for positioning of the texts. Visual quality is lower.
- ConsoleNoActiveAlarmsAutoRecognizeTimeInDays**: Maximum time in days that non-active and unacknowledged alarms can remain in the system. After this time has lapsed, these alarms will be automatically acknowledged by the system and will disappear. Default time "1" day.**

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B. Configuration of Remote Connection for Web Clients

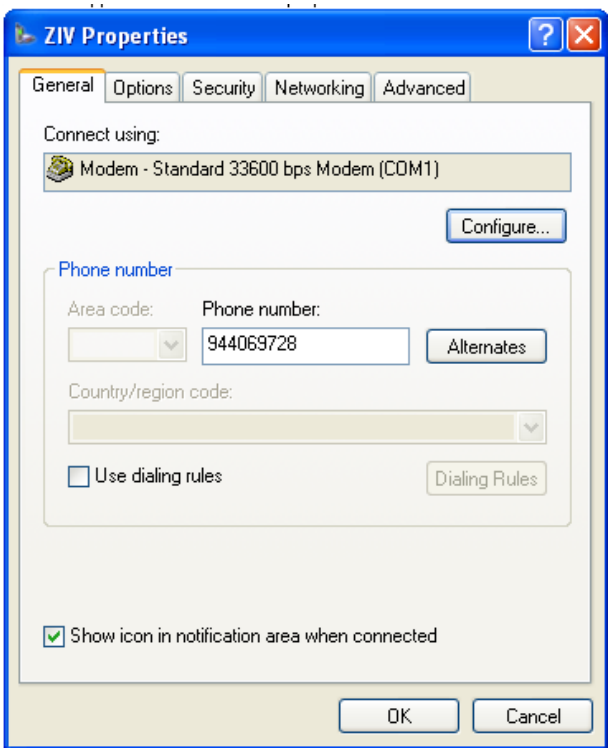
B.1 Connection Configuration B-2

B.1 Connection Configuration

In order to connect via modem from a client to the Embedded Web HMI, the remote connection must be previously configured in the PC from which the web client will be launched. This remote connection will enable establishing the connection via PPP protocol between the PC client and the UCS's RAS server.

Below are the steps to follow:

In **Control Panel-> Network Connections** make a connection of the type **Connect to a workstation network** and select the option **telephone access connection** (via modem).



Also, it will be necessary to install previously the modem from the Windows Control Panel with the utility Add new Hardware. Once the modem has been installed it must be configured in one of the serial ports (in the example, port Com1 at 19200 bps).

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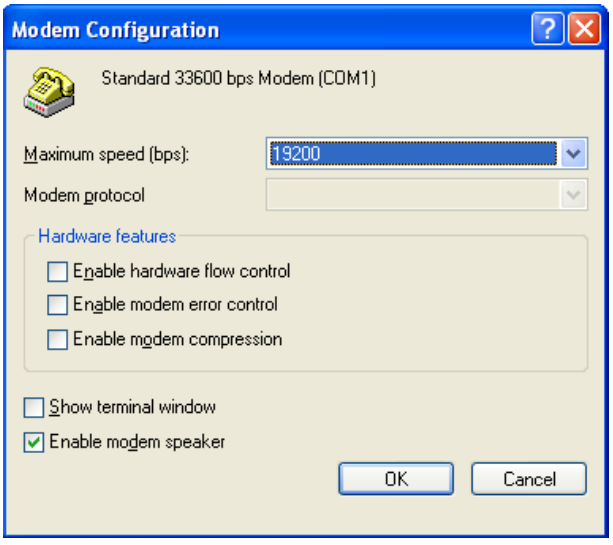

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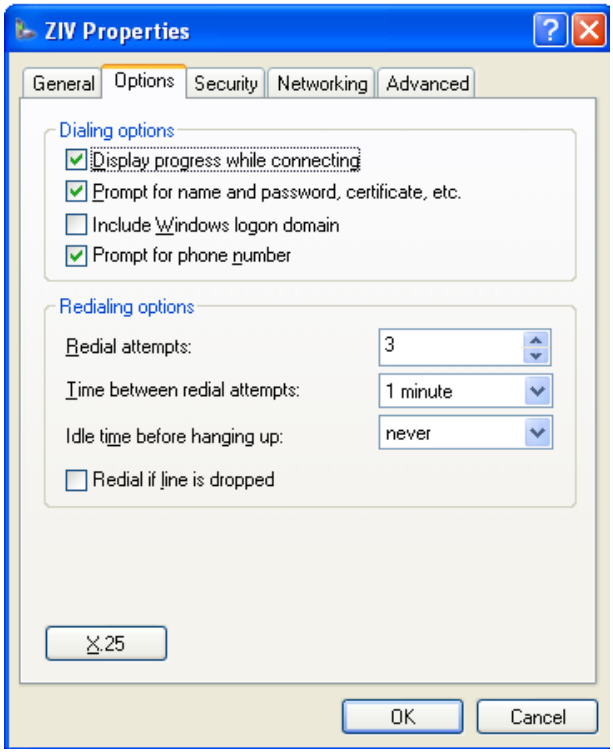
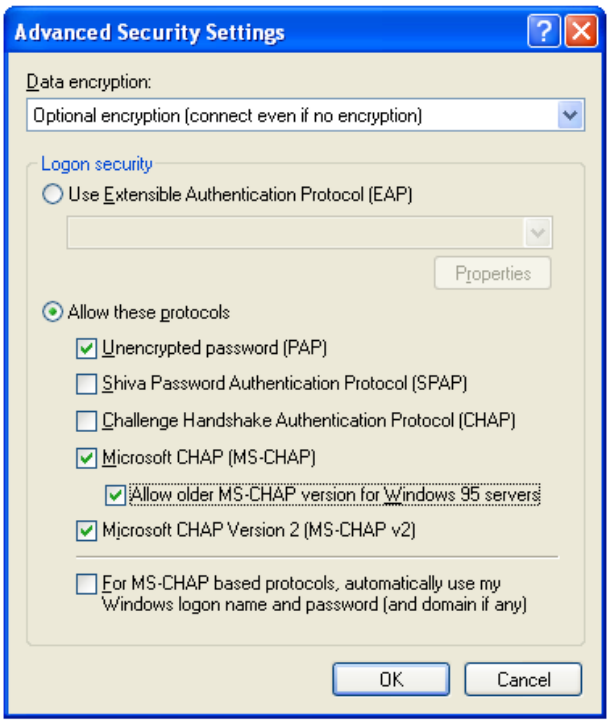
With the options:



and with the following settings in the **Advanced security** tab:


Advanced Security Settings
Data encryption:
Optional encryption (connect even if no encryption)
Logon security
Use Extensible Authentication Protocol (EAP)
Properties
Allow these protocols
Unencrypted password (PAP)
Shiva Password Authentication Protocol (SPAP)
Challenge Handshake Authentication Protocol (CHAP)
Microsoft CHAP (MS-CHAP)
Allow older MS-CHAP version for Windows 95 servers
Microsoft CHAP Version 2 (MS-CHAP v2)
For MS-CHAP based protocols, automatically use my Windows logon name and password (and domain if any)
OK
Cancel

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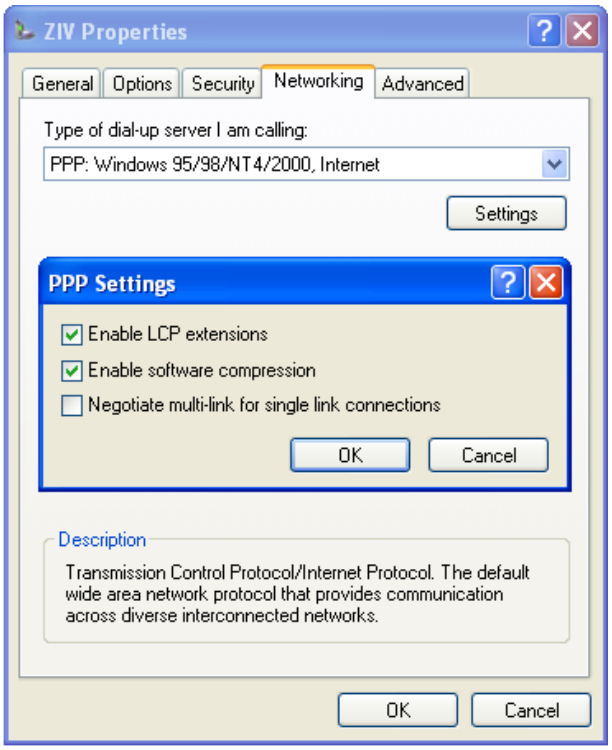
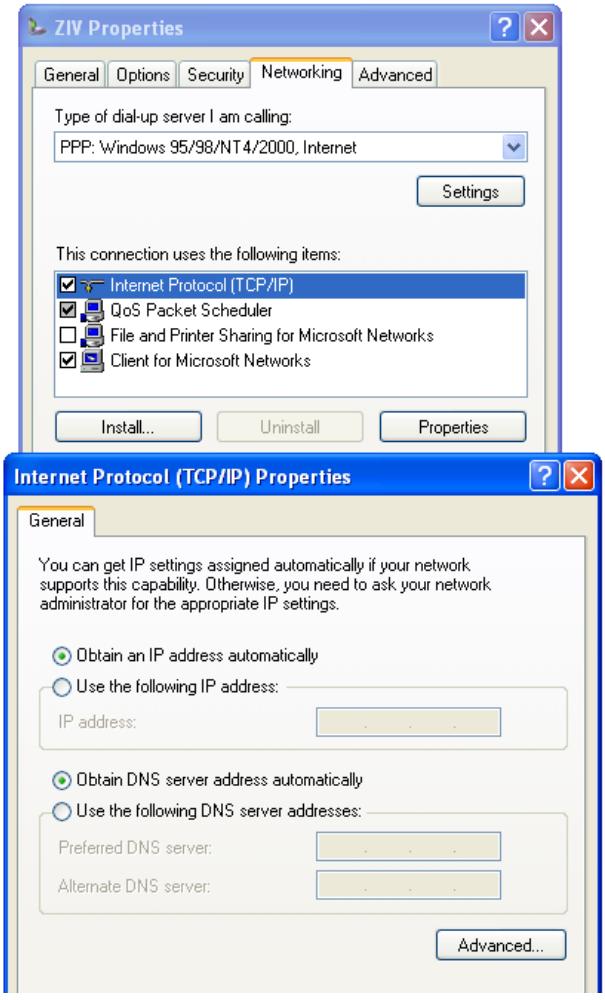
Check the protocol PPP has the following properties:



And in the protocol TCP-IP properties, select the option "Obtain an IP address automatically" when connecting to the UCS's RAS server.



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C.1 List of Illustrations

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D. Warranty

ZIV GRID AUTOMATION, S.L.
Standard Product Warranty

All new products sold to customers are warranted against defects in design, materials, and workmanship for a period of ten (**10**) years from the time of delivery (at the moment the product leaves ZIV GRID AUTOMATION premises, as indicated in the shipping documents). Customer is responsible of notifying ZIV GRID AUTOMATION of any faulty conditions as soon as they are detected. If it is determined that the new product defect is covered by the warranty, ZIV GRID AUTOMATION will repair, or substitute the product at its own discretion to the customer at no charge.

ZIV GRID AUTOMATION may, at its own discretion, require the customer to ship the unit back to the factory for diagnosis before making a determination as to whether it is covered by this warranty. Shipping costs to the ZIV GRID AUTOMATION factory (including but not limited to, freight, insurance, customs fees and taxes, and any other expenses) will be the responsibility of the customer. All expenses related to the shipment of the repaired or replacement units back to the customer will be borne by ZIV GRID AUTOMATION.

Customers are responsible for all expenses related to the shipment of defective units back to ZIV GRID AUTOMATION when it is determined that such units are not covered under this warranty or that the fault is not ZIV GRID AUTOMATION´s responsibility. Units repaired by ZIV GRID AUTOMATION are warranted against defects in materials, and manufacturing for a period of one (1) year from the time of delivery (at the moment the product leaves ZIV GRID AUTOMATION premises, as indicated by the shipping documents), or for the remaining of the original warranty, whichever is greater.

ZIV GRID AUTOMATION warranty does not cover: 1) improper installation, connection, operation, maintenance, and/or storage, 2) minor defects not interfering with the operation of the product, possible indemnities, misuse or improper usage, 3) abnormal or unusual operating conditions or application outside the specifications for the product, 4) application in any way different from that for which the products were designed, 5) repairs or alterations performed by individuals other than ZIV GRID AUTOMATION employees or an authorised representative.

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3) In the case that a bank guarantee or similar instrument be required to back up the warranty period, such warranty period, and only for these purposes, will be of a maximum of twelve (12) months from the time of delivery (at the moment the product leaves ZIV GRID AUTOMATION premises, as indicated in the shipping documents).

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